Dynojet RESEARCH

User Guide

For the Power Vision and WinPV Software

98100016.07

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User Guide for the Power Vision and WinPV Software.

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TABLE OF CONTENTS

Chapter 1 Welcome to Dynojet WinPV Software

Notice 1-1
Contacting Dynojet 1-1
Conventions 1-2

Chapter 2 Getting Started

Power Vision Driver Installation 2-2
Windows XP Driver Installation 2-2
Windows Vista and Windows 7 Driver Installation 2-4
Checking the WinPV Update Client 2-5
Installing the Power Vision on the Motorcycle 2-9
Power Vision Tune File Management 2-12
Flashing a Dynojet Pre-Configured Tune File 2-14
Flashing a Custom Tune File 2-17
Loading a Copy of the Original Tune File or
a Copy of the Current Tune File 2-19

Chapter 3 Working with WinPV

WinPV User Interface 3-2
WinPV Menus 3-3
Help Menu 3-4
File Menu 3-5
To Open a Power Vision Tune File (.PVT) 3-5
To Save a Power Vision Tune File (.PVT) 3-6
To Import a Power Commander Map File (.pvm;.djm) 3-7
To Save All Values 3-9
To Save Selected Values 3-10
To Save Selected Values—Append 3-11
To Load All Values 3-12
To Load Selected Values 3-14
To Exit the WinPV Software 3-15

Edit Menu 3-16
To Undo 3-16
To Redo 3-16
To Cut/Copy/Paste Selected Values 3-16
To Smooth Selected Values 3-16
To Interpolate Selected Values 3-16
To Interpolate Selected Horizontal Values 3-16
To Interpolate Selected Vertical Values 3-16
PowerVision Menu 3-17
To View the PowerVision Information 3-17
To Get a Tune from the Power Vision 3-17
To Send a Tune to the Power Vision 3-18
To Get a Log from the Power Vision 3-19
To Update the Tune Using the Power Vision 3-21
To Get ECM Data from the Power Vision 3-21
To Send the Original Tune to the Power Vision 3-23
To Send a Stock File to the Power Vision 3-24
To Exit PC Link Mode 3-24
Compare Menu 3-25
To Load a Compare File 3-25
To Close the Compare File 3-25
To View the Active File 3-25
To View the Compare File 3-26
To View Delta 3-26
To Choose Cell Colors 3-26
To Show Only Differences 3-27
To Show Delta As Percent 3-27
To Create Difference Report 3-27
Setup Menu 3-28
To Setup the Options 3-28
To Apply the License 3-31
View Menu 3-32
To View the Standard Toolbar 3-32
To View the Cell Math Toolbar 3-32
To View the PowerVision Toolbar 3-32
To View the Compare Toolbar 3-32
To Reset the User Interface 3-32
Help Menu 3-33
To View the About Window 3-33
To View the Power Vision Help Files 3-33
WinPV Toolbar 3-34
Standard Toolbar 3-34
PowerVision Toolbar 3-35
Cell Math Toolbar 3-36
Compare Toolbar 3-37
Customizing the Toolbars 3-38

Tune Items 3-39
Tune Info 3-42
Airflow 3-42
Environment 3-45
Fuel 3-47
Closed Loop 3-49
Gear 3-49
Limits and Switches 3-50
Spark 3-51
Table 3-53
Status Bar 3-54

Chapter 4 Working with Power Vision

Power Vision Menus 4-2
Program Vehicle Menu 4-4
To Load a Dynojet Pre-Configured Tune File 4-4
To Load a Custom Tune File 4-8
To Load a Copy of Original Tune File 4-9
To Load a Copy of Current Tune File 4-12
To Edit a Tune File 4-15
To Check the ECM Status 4-16
To Enable AutoTune 4-17
To Start an AutoTune Session 4-21
To Export a Learned Tune 4-24
To Load a Custom Tune File 4-27
To Edit AutoTune Settings 4-29
To Configure Quick Tune 4-34
Datalog Menu 4-39
To View Gauges 4-39
To Create Gauge Limits and Visual Warnings 4-41
To Playback a Log 4-45
To View Signals 4-46
To Reset Trip/Economy A 4-46
To Reset Trip/Economy B 4-47
To Create a Log with Power Vision 4-47
To Return to the Power Vision Main Menu 4-47
Vehicle Tools Menu 4-48
To View Vehicle Info 4-48
To View Stored DTC's 4-49
To Reset Trims 4-50
To Read ECM 4-51
To Restore Original Tune 4-52
To Return to the Power Vision Main Menu 4-52

Settings Menu 4-53
To Select the Units 4-53
To Change the Brightness 4-53
To Enter a Code 4-55
To Calibrate the Touch Screen 4-55
To Flip the Power Vision Screen 4-55
To Return to the Power Vision Main Menu 4-55
Device Info Menu. 4-56
To View Information About the Power Vision 4-56
Dealer Info Menu. 4-57
To View Information About the Dealer 4-57
Understanding AutoTune 4-58
AutoTune Basic 4-59
AutoTune Pro 4-59
AutoTune Wideband O2 Sensor Installation Options 4-60
Changes Made During AutoTune 4-60
AutoTune Notes and Tips 4-61

Index . . . . . Index-i

CHAPTER

1

WELCOME TO DYNOJET WINPV SOFTWARE

The Software Engineers at Dynojet understand your need to attain the maximum performance from the Harley Davidson motorcycles you evaluate and tune. For this reason, they have developed a user-friendly interface which will allow you to easily develop new fuel and ignition maps, record and download log files, and increase performance with the click of a button. Whether you are new to the benefits of dyno testing and tuning or an experienced performance leader, the Power Vision in conjunction with the WinPV software will give you the professional results you are looking for.

WinPV Help provides information and step-by-step guidance for common tasks, as well as descriptions of each field on each window.

Notice

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The Power Vision is approved for racing vehicle use only.

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Document Part Number 98100016.07

Contacting Dynojet

Please contact us with your questions and comments. If you need assistance with an issue, please contact Dynojet Technical Support.

Telephone

800.992.4993

Email

pvtech@dynojet.com

Website

www.dynojet.com

www.flashyourharley.com

Write to us

2191 Mendenhall Drive

North Las Vegas, NV 89081

Conventions

WinPV Software documentation uses consistent conventions to help you identify items. The following table summarizes these conventions.

example of convention	description
Bold	Highlights items you can select on in the software interface, including buttons and menus.
>	The arrow indicates a menu choice. For example, “select **File >Open**” means “select the **File** menu, then select the **Open** choice on the **File** menu.”
Blue	Words highlighted in blue indicate a link.

CHAPTER

2

GETTING STARTED

This section will guide you through installing the Power Vision drivers, checking the WinPV Update Client, installing the Power Vision on your motorcycle, and saving a stock calibration.

This section is divided into the following categories:

- Power Vision Driver Installation, page 2-2
- Checking the WinPV Update Client, page 2-5
- Installing the Power Vision on the Motorcycle, page 2-9
- Power Vision Tune File Management, page 2-12

Power Vision Driver Installation

[Windows XP Driver Installation](#)
[Windows Vista and Windows 7 Driver Installation](#)

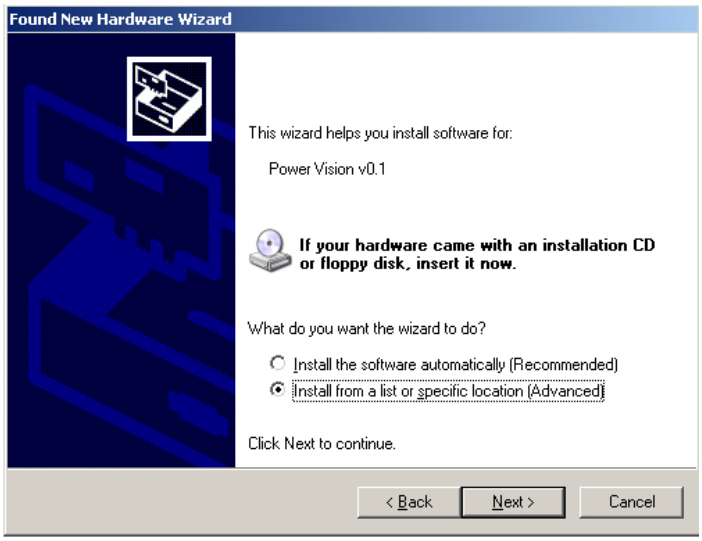
Windows XP Driver Installation

1 Using the USB cable, connect the Dynojet Power Vision to your computer. The Found New Hardware window will open.

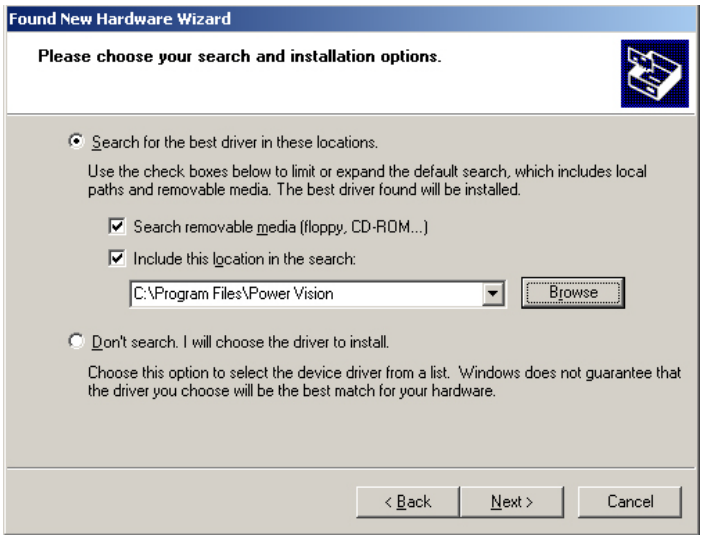
2 Select **Yes, this time only** and click **Next**.

Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
Windows will search for current and updated software by looking on your computer, on the hardware installation CD, or on the Windows Update Web site (with your permission).
Read our privacy policy
Can Windows connect to Windows Update to search for software?
Yes, this time only
Yes, now and every time I connect a device
No, not this time
Click Next to continue.
< Back
Next >
Cancel

3 Select **Install from a list or specific location** and click **Next**.


Found New Hardware Wizard
This wizard helps you install software for:
Power Vision v0.1
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel

4 Select **Search for the best driver in these locations**.
5 Verify the location points to your Power Vision folder in Program Files.
6 Click **Next**.


Found New Hardware Wizard
Please choose your search and installation options.
Search for the best driver in these locations.
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.
Search removable media (floppy, CD-ROM...)
Include this location in the search:
C:\Program Files\Power Vision
Browse
Don't search. I will choose the driver to install.
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.
< Back
Next >
Cancel

7 Click **Finish** to close the wizard.

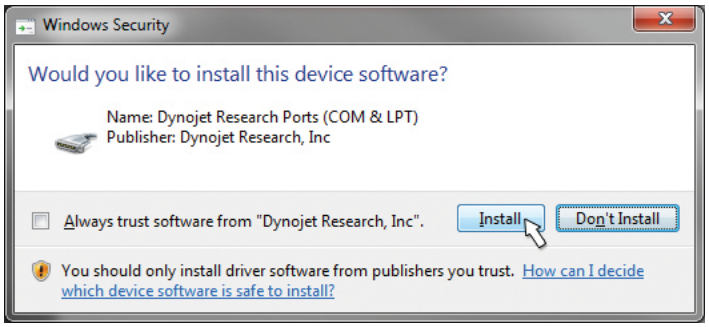
8 Continue with Checking the WinPV Update Client.

Windows Vista and Windows 7 Driver Installation

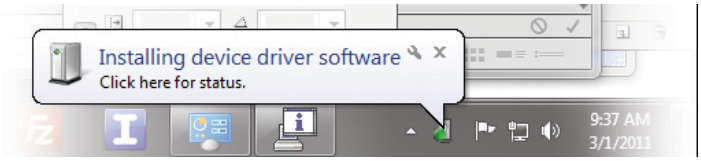
Power Vision Device Drivers will be installed during software installation.

A Windows Security warning will pop up during this process.

Click **Install** to continue.


Windows Security
Would you like to install this device software?
Name: Dynojet Research Ports (COM & LPT)
Publisher: Dynojet Research, Inc
Always trust software from "Dynojet Research, Inc".
Install
Don't Install
You should only install driver software from publishers you trust. How can I decide which device software is safe to install?

Note: During the installation, a notice on the bottom of your screen will appear letting you know the status of the device driver installation progress.

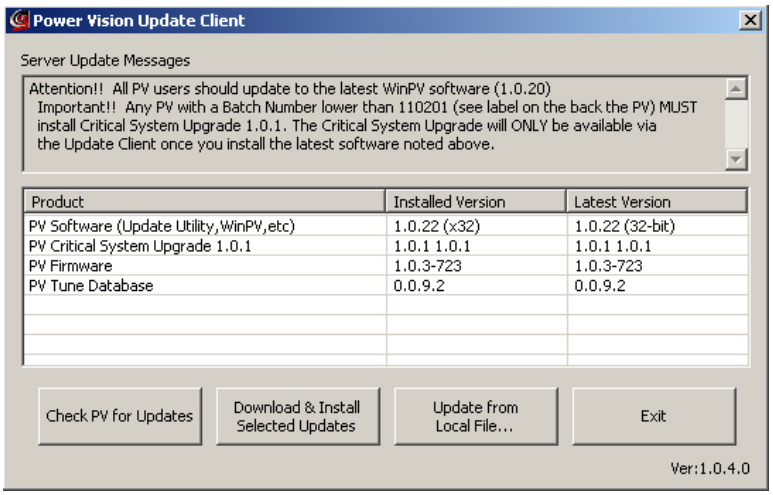


Checking the WinPV Update Client

The PV Update Client automatically checks for any applicable updates. The latest versions of the Firmware, Software, Tune Database, and any Critical Updates will be displayed in the Latest Version column. Your currently installed versions will be displayed in the Installed Version column.

Note: Please read the Update Messages on the top of the Update Client window for any critical updates and follow any directions given there first.

1. Using the USB cable, connect the Dynojet Power Vision to your computer.
2. Click **Start** on the Windows® task bar, and click **All Programs**.
3. Select **PowerVision >PV Update Client**.
4. Click **Check For Updates**.
5. Select the desired update to install.
6. Click **Download & Install Selected Updates**.


Power Vision Update Client
Server Update Messages
Attention!! All PV users should update to the latest WinPV software (1.0.20)
Important!! Any PV with a Batch Number lower than 110201 (see label on the back the PV) MUST install Critical System Upgrade 1.0.1. The Critical System Upgrade will ONLY be available via the Update Client once you install the latest software noted above.
Product
Installed Version
Latest Version
PV Software (Update Utility,WinPV,etc)
1.0.22 (x32)
1.0.22 (32-bit)
PV Critical System Upgrade 1.0.1
1.0.1 1.0.1
1.0.1 1.0.1
PV Firmware
1.0.3-723
1.0.3-723
PV Tune Database
0.0.9.2
0.0.9.2
Check PV for Updates
Download & Install Selected Updates
Update from Local File...
Exit
Ver:1.0.4.0

7. As the firmware and tune database downloads are completed, click **OK** to complete.

8. As the software and update client downloads are completed, click **OK** to begin the software download.

   Note: The Update Client needs to be restarted for any further updates.

   The Welcome to the Power Vision Software Setup Wizard window will appear.

9 Click **Next** to continue.

Power Vision Software Setup
Welcome to the Power Vision Software Setup Wizard
The Setup Wizard will install Power Vision Software on your computer. Click Next to continue or Cancel to exit the Setup Wizard.
Back
Next
Cancel

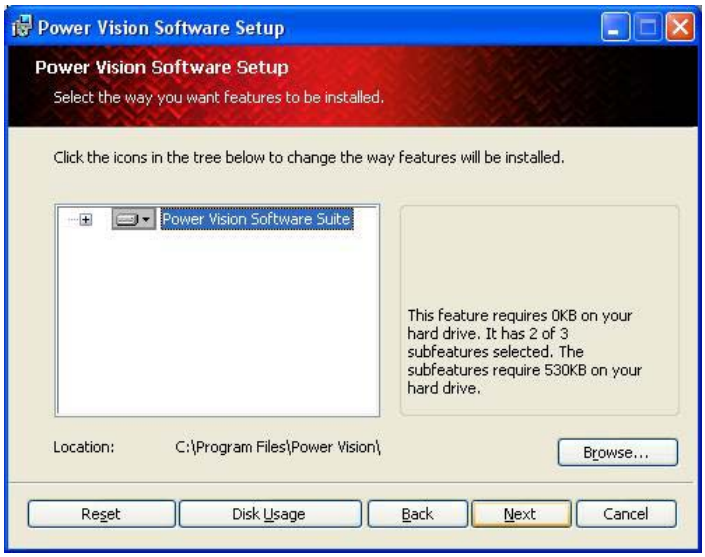
10 Carefully read the Power Vision software license agreement, check the accept box, and click **Next** to continue.

To install the Power Vision software, you must accept this agreement. If you do not, Setup will close.

Power Vision Software Setup
Power Vision Software Setup
Please read the following license agreement carefully
USER LICENSE AGREEMENT FOR DYNOJET RESEARCH
- Power Vision -
IMPORTANT-READ CAREFULLY: This User License Agreement herein after referred to as ("ULA") is a legal agreement between you (either an individual or a single entity) and Dynojet Research Inc. for the software identified above ("Power Vision") and any hardware developed by Dynojet Research Inc. or its suppliers that is used in association with Power Vision. Power Vision includes computer software, the associated media, any printed materials, any "online" or electronic documentation and associated hardware..
I accept the terms in the License Agreement
Print
Back
Next
Cancel

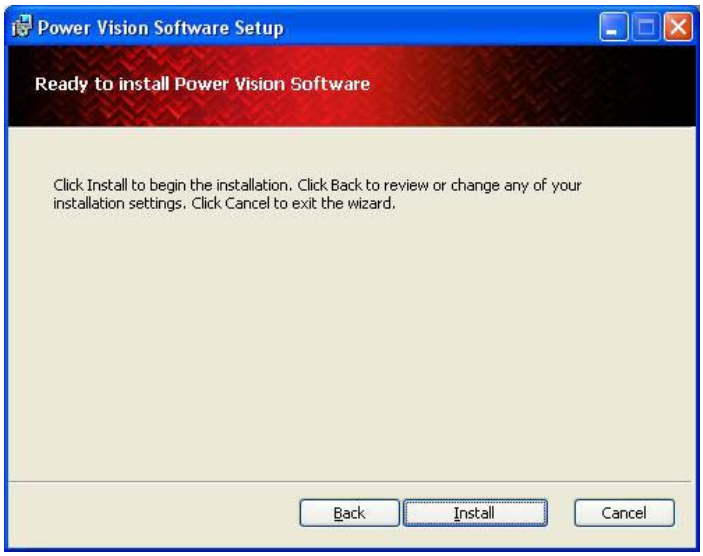
The Power Vision Software Feature window will appear.

11 Click **Next** to continue. Dynojet recommends you do not make any changes in this window.

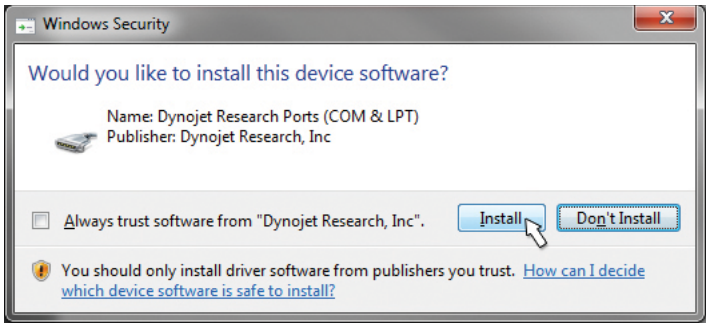

Power Vision Software Setup
Power Vision Software Setup
Select the way you want features to be installed.
Click the icons in the tree below to change the way features will be installed.
Power Vision Software Suite
This feature requires 0KB on your hard drive. It has 2 of 3 subfeatures selected. The subfeatures require 530KB on your hard drive.
Location:
C:\Program Files\Power Vision\
Browse...
Reset
Disk Usage
Back
Next
Cancel

Setup is ready to install the Power Vision Software.

12 Click **Install** to begin installation.


Power Vision Software Setup
Ready to install Power Vision Software
Click Install to begin the installation. Click Back to review or change any of your installation settings. Click Cancel to exit the wizard.
Back
Install
Cancel

Note: Windows Vista and Windows 7 users—A Windows Security warning will pop up during the installation process; this is normal. Click **Install** to continue.


Windows Security
Would you like to install this device software?
Name: Dynojet Research Ports (COM & LPT)
Publisher: Dynojet Research, Inc
Always trust software from "Dynojet Research, Inc".
Install
Don't Install
You should only install driver software from publishers you trust. How can I decide which device software is safe to install?

13 The Power Vision Software update is now complete. Click **Finish** to exit the Setup Wizard.

Installing the Power Vision on the Motorcycle

The following installation was performed on a 2008 Harley-Davidson Night Rod. Your bike and set-up may vary.

Note: The Power Vision may be damaged if installed improperly. To ensure safety and accuracy in the procedures, perform the procedures as they are described.

1 Connect the PowerVision to the ECM's diagnostic port.

The location of the diagnostic port varies depending on the model. Please refer to the following table or consult your service manual for the exact location.

model	diagnostic connector location
2001-2013 Softail models	Diagnostic connector is located under the seat, attached to the frame by the rear fender. This connector is light grey in color, with a black rubber plug installed. Note: Requires removing the seat.
2004-2013 Dyna models	Diagnostic connector is located behind the left hand side cover. This connector is light grey in color with a black rubber plug installed.
2007-2013 Sportster models (including XR models)	Diagnostic connector is located behind the left hand side cover. This connector is light grey in color with a black rubber plug installed.
2002-2013 V-Rod models	Diagnostic connector is located behind the right front frame cover. This connector is light grey in color with a black rubber plug installed. Note: Tools required to access.
2002-2007 Touring models	Diagnostic connector is located behind the right hand side cover. This connector is light grey in color with a black rubber plug installed. Note: Requires removing the right side saddle bag.
2008-2013 Touring models	Diagnostic connector is located behind the left hand side cover. This connector is light grey in color with a black rubber plug installed. Note: Requires removing the left side saddle bag.

Note: Many models use the same style connector for accessories. The Power Vision must be connected to the diagnostic port.

2 Route the PowerVision cable away from any moving or hot parts.

Dynojet recommends using zip ties to secure the cable to existing non-moving components.

3 The PowerVision module may be mounted to the bike's handlebars using Techmount hardware.

Note: The Power Vision does not need to remain on the bike.

In this example, the Power Vision module is mounted to a 2008 Night Rod using the Techmount bracket.

For more information on available mounting accessories visit: www.techmounts.com.

Power Vision Tune File Management

There are three types of tunes that can be flashed to your ECM with the Power Vision:

- Dynojet Pre-Configured Tunes—refer to Flashing a Dynojet Pre-Configured Tune File
- Custom Tunes—refer to Flashing a Custom Tune File
- Load Copy—refer to Loading a Copy of the Original Tune File or a Copy of the Current Tune File

Flashing your ECM with any one of these types of tunes will automatically save a backup of your Original Tune and will permanently lock the Power Vision to your bike's ECM.

You can flash your ECM with tunes as many times as you like, but the Power Vision will only be permitted to flash tunes to the ECM it's locked to. The Power Vision's other features, like data logging/monitoring, diagnostics, clearing adaptive values, etc. will still be available to be used on any bike it was designed for, as well as the bike it's locked to.

Any combination of the three types of tune files can be placed in the Tune Manager. There are six slots in the Tune Manager and you can occupy a single slot or all six if you choose.

For example, you could have a Dynojet Pre-Configured Tune in Slot 1, a Custom Tune in Slot 2, and a Copy of Original Tune in Slot 3. You can think of the Tune Manager as an area that holds the tunes, or stages them, prior to the Power Vision flashing them to your ECM. You can overwrite the tunes that occupy the various slots at any time, or manage your tune files in the Tune Manager by using the WinPV software.

Flashing a Dynojet Pre-Configured Tune File

The Power Vision is loaded with Pre-Configured Tunes developed by Dynojet when it leaves our facility. Dynojet makes every effort to have a tune file available for your specific combination when you receive your Power Vision (pre-loaded in the device), but in some cases you'll need to use the Update Client to ensure you have the latest tunes available from Dynojet. Refer to Checking the WinPV Update Client.

You can also visit http://www.flashyourharley.com to search our tune database and download a tune for your combination.

Use the following steps to flash a Dynojet Pre-Configured Tune to the ECM.

1 Touch **Program Vehicle >Load Tune >Dynojet Pre-Configured Tunes**.

The Power Vision will automatically search for compatible tunes.

2 Select a Dynojet Pre-Configured Tune File to flash.

3 Touch **Select**.

4 Verify the tune information. If the tune information is correct, touch **Continue**.

5 Select a slot to save the selected tune file.
Note: If there is any data in the selected slot, it will be overwritten.

6 Touch **Select**.

The tune is now ready.

7 Touch **Flash** to flash this tune to the ECM.

Note: During the flash process, do not turn off the bike. Once complete, you will be prompted to turn the bike off for 10 seconds.

Or

Touch **Edit** to edit this tune.

Or

Touch **Exit** to exit the screen without any changes.

Note: You can edit any tune that's loaded in the Tune Manager prior to flashing your ECM. The Power Vision allows you to make basic adjustments to your tunes directly on the device without using a computer. In order to gain full access to your tune files, you'll need to download them from the Power Vision to WinPV, our custom tuning software.

Flashing a Custom Tune File

Custom Tunes may or may not be pre-loaded from a reseller that specializes in custom tuning. Dynojet does NOT load custom tunes in the Power Vision when it leaves our facility (we load Dynojet Pre-Configured Tunes). You may also receive Custom Tunes via email that can be uploaded to the Power Vision using WinPV, our custom tuning software.

Use the following steps to flash a Custom Tune file to the ECM.

1 Touch **Program Vehicle >Load Tune >Custom Tunes**.

2 Select a Custom Tune File to flash.

3 Touch **Select**.

4 Verify the tune information. If the tune information is correct, touch **Continue**.

The Tune is now ready.

5 Touch **Flash** to flash this tune to the ECM.

Note: During the flash process, do not turn off the bike. Once complete, you will be prompted to turn the bike off for 10 seconds.

Or

Touch **Edit** to edit this tune.

Or

Touch **Exit** to exit the screen without any changes.

Note: You can edit any tune that's loaded in the Tune Manager prior to flashing your ECM. The Power Vision allows you to make basic adjustments to your tunes directly on the device without using a computer. In order to gain full access to your tune files, you'll need to download them from the Power Vision to WinPV, our custom tuning software.

Loading a Copy of the Original Tune File or a Copy of the Current Tune File

The Power Vision will allow you to load either a Copy of Current tune or a Copy of Original tune files.

The Copy of Original tune file is a copy of the tune that was present in your ECM when the Power Vision first locked to your ECM. In other words, it is a copy of the backup file that was created and stored in the Power Vision. This is a great way for those who are happy with the way their bike runs, but want access to their existing tune in order to make a few adjustments.

The Copy of Current tune file is a copy of the current tune that has been flashed to your ECM.

Use the following steps to load and flash either a Copy of Original tune or a Copy of Current tune file to the ECM.

1 Touch **Program Vehicle >Load Tune >Load Copy**.

2 Touch **Load Copy of Current** or **Load Copy of Original**.

3 Select a slot to save the tune file.
Note: If there is any data in the selected slot, it will be overwritten.

4 Touch **Select** to continue.

The Tune is now ready.

5 Select **Flash** to flash this tune to the ECM.
Note: During the flash process, do not turn off the bike. Once complete, you will be prompted to turn the bike off for 10 seconds.

Or

Touch **Edit** to edit this tune.

Or

Touch **Exit** to exit the screen without any changes.

Note: You can edit any tune that's loaded in the Tune Manager prior to flashing your ECM. The Power Vision allows you to make basic adjustments to your tunes directly on the device without using a computer. In order to gain full access to your tune files, you'll need to download them from the Power Vision to WinPV, our custom tuning software.

CHAPTER

3

WORKING WITH WINPV

WinPV Software is a user-friendly interface which will allow you to easily develop new fuel and ignition maps, record and download log files, and increase performance with the click of a button.

This section is divided into the following categories:

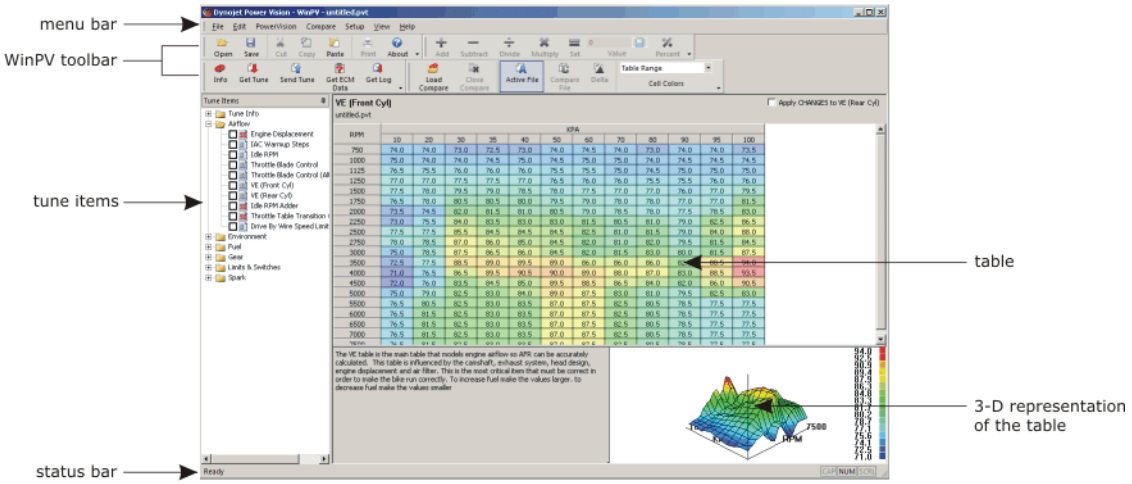
- WinPV User Interface, page 3-2
- WinPV Menus, page 3-3
- WinPV Toolbar, page 3-34
- Tune Items, page 3-39
- Table, page 3-53
- Status Bar, page 3-54

WinPV User Interface

WinPV is designed to be user-friendly and intuitive. Once you understand the basic layout, it will be easy to obtain information and navigate the software efficiently.

The main elements of the WinPV User Interface are:

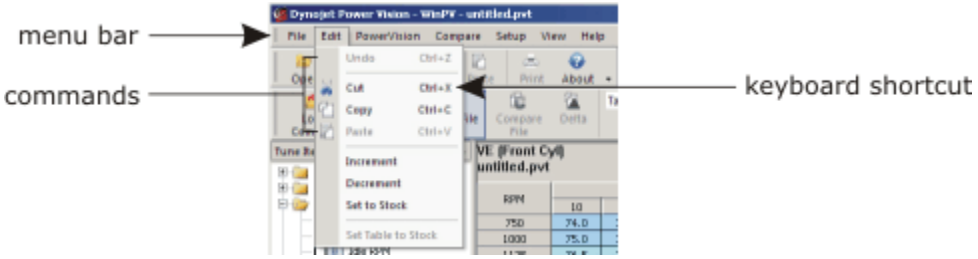
[WinPV Menus](#)
[Tune Items](#)
[WinPV Toolbar](#)
[Table](#)



WinPV Menus

The menu bar displays the seven menus available in WinPV: File, Edit, PowerVision, Compare, Setup, View, and Help. Each menu contains groups of related commands. Many commands are followed by keyboard shortcuts.

As you use WinPV, you will develop your own working style. Maybe you will prefer to use the mouse and menu commands or you may find that you prefer the quick access to features provided by keyboard commands.



Use the following menus and commands with WinPV.

File Menu

To Open a Power Vision Tune File (.PVT)

To Save a Power Vision Tune File (.PVT)

To Import a Power Commander Map File (.pvm;.djm)

To Save All Values

To Save Selected Values

To Save Selected Values—Append

To Load All Values

To Load Selected Values

To Exit the WinPV Software

Edit Menu

To Undo

To Cut/Copy/Paste Selected Values

To Smooth Selected Values

To Interpolate Selected Values

To Interpolate Selected Horizontal Values

To Interpolate Selected Vertical Values

PowerVision Menu

To View the PowerVision Information
To Get a Tune from the Power Vision
To Send a Tune to the Power Vision
To Get a Log from the Power Vision
To Update the Tune Using the Power Vision
To Get ECM Data from the Power Vision
To Send the Original Tune to the Power Vision
To Send a Stock File to the Power Vision
To Exit PC Link Mode

Compare Menu

To Load a Compare File
To Close the Compare File
To View the Active File
To View the Compare File
To View Delta
To Choose Cell Colors
To Show Only Differences
To Show Delta As Percent
To Create Difference Report

Setup Menu

To Setup the Options
To Apply the License

View Menu

To View the Standard Toolbar
To View the Cell Math Toolbar
To View the PowerVision Toolbar
To View the Compare Toolbar
To Reset the User Interface

Help Menu

To View the About Window
To View the Power Vision Help Files

File Menu

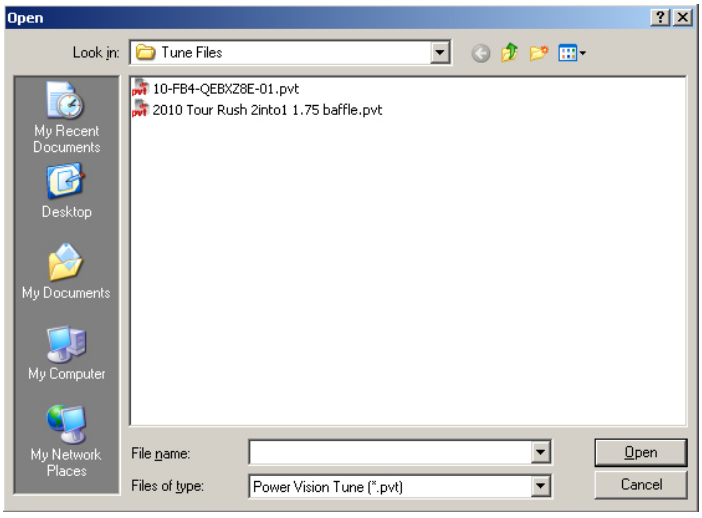
To Open a Power Vision Tune File (.PVT)

If the Tune File directory does not exist, or if you haven't already created the Tune File directory, you will need to create a Tune File directory in C:\Program Files\Power Vision. Once the Tune File directory is created, you must map this folder in Setup Options. Refer to To Setup the Options.

To open a Power Vision tune file from the Power Vision, refer to To Get a Tune from the Power Vision.

Use the following steps to open a Power Vision tune file from your computer.

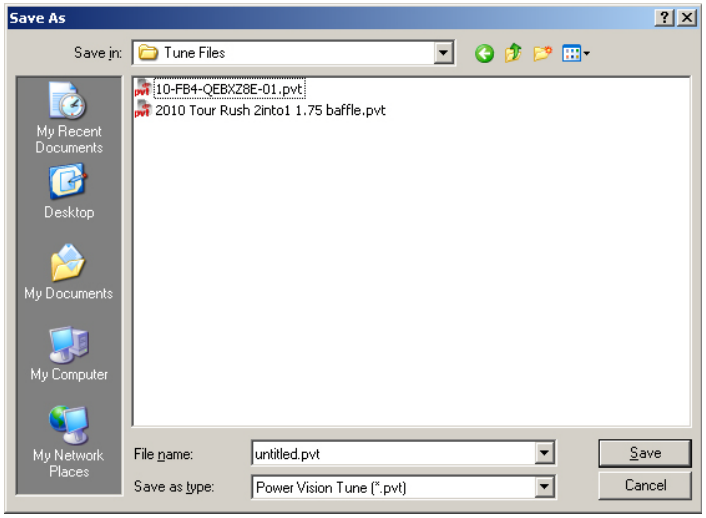
1. Select **File >Open**.
2. Select a .pvt file to open.
3. Click **Open**.



To Save a Power Vision Tune File (.PVT)

If the Tune File directory does not exist, or if you haven't already created the Tune File directory, you will need to create a Tune File directory in C:\Program Files\Power Vision. Once the Tune File directory is created, you must map this folder in Setup Options. Refer to To Setup the Options.

1. Select **File >Save As**.
2. Enter a name for your tune file.
3. Click **Save**.



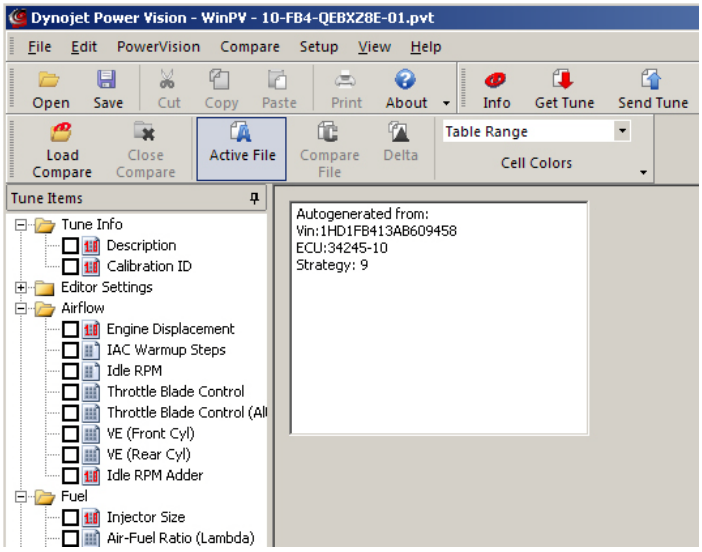
To Import a Power Commander Map File (.pvm;.djm)

1 Make sure you have a tune loaded.

You must have a copy of the original tune loaded before importing a Power Commander map file.

2 Select **Tune Info** from the Tune Items manager and click **Description**.

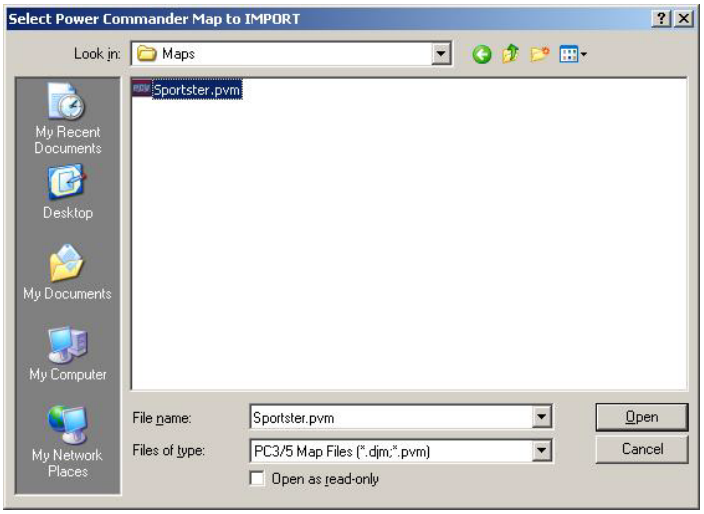
If the Strategy is 9, 44, or 218, the Power Commander map file will not import. When the existing VE tables are RPM versus MAP (KPA), you will not be able to import Power Commander map files. The example below shows a strategy of 9 and will not work when importing a Power Commander map file.



3 Select **File > Import Power Commander Map**.

4 Select a file to open.

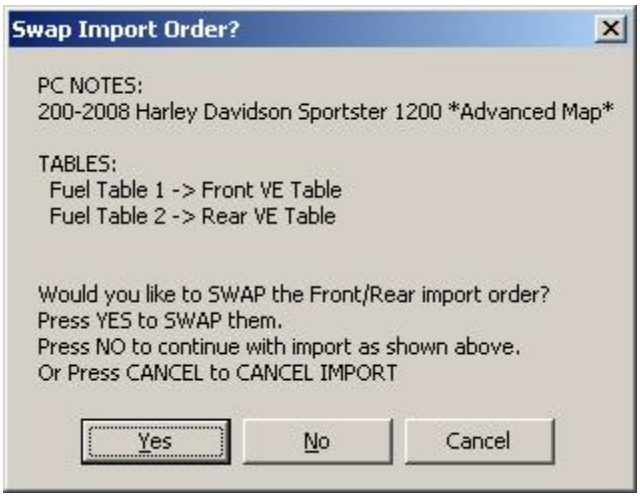
5 Click **Open**.



6 Click **Yes** to swap the Front/Rear import order.

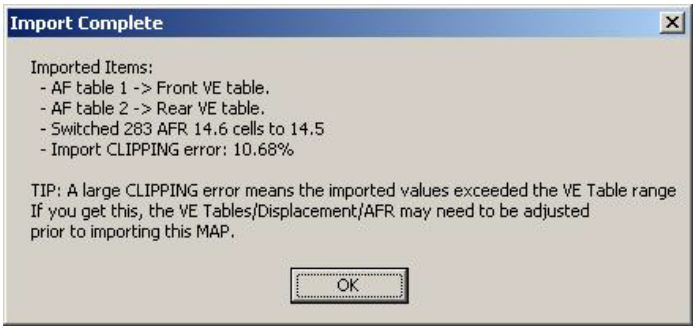
Or

Click **No** to import as shown in the window.


Swap Import Order?
PC NOTES:
200-2008 Harley Davidson Sportster 1200 *Advanced Map*
TABLES:
Fuel Table 1 -> Front VE Table
Fuel Table 2 -> Rear VE Table
Would you like to SWAP the Front/Rear import order?
Press YES to SWAP them.
Press NO to continue with import as shown above.
Or Press CANCEL to CANCEL IMPORT
Yes
No
Cancel

The Import Complete window will appear. This window will explain which tables were imported where, how many cells were switched to 14.5, and how many imported values exceeded the VE Table range.The maximum value in a cell is 127.5. If you see 127.5 in a cell, you know the imported Power Commander map tried to exceed that value.

7 Click **OK**.


Import Complete
Imported Items:
- AF table 1 -> Front VE table.
- AF table 2 -> Rear VE table.
- Switched 283 AFR 14.6 cells to 14.5
- Import CLIPPING error: 10.68%
TIP: A large CLIPPING error means the imported values exceeded the VE Table range
If you get this, the VE Tables/Displacement/AFR may need to be adjusted
prior to importing this MAP.
OK

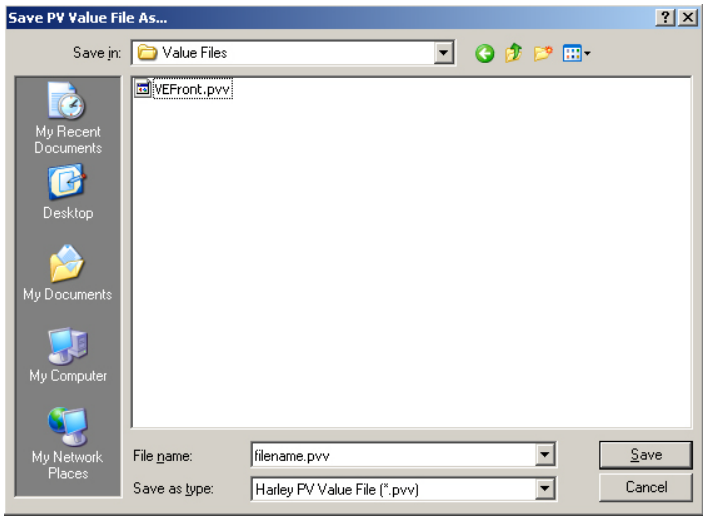
To Save All Values

Value Files are one or more tables that are selected in WinPV. Save All Values will save all of the value files in the open tune file into a Value File for later use.

If the Value File directory does not exist, or if you haven't already created the Value File directory, you will need to create a Value File directory in C:\Program Files\Power Vision. Once the Value File directory is created, you must map this folder in Setup Options. Refer to To Setup the Options.

1. Make sure you have a tune loaded.

   You must have a tune loaded before saving values.
2. Select **File >Save All Values**.
3. Enter a name for your value file.
4. Click **Save**.

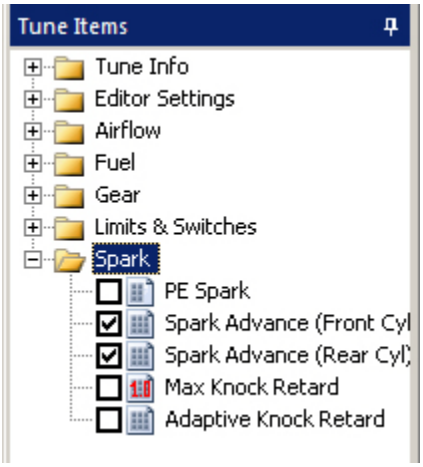


To Save Selected Values

Value Files are one or more tables that are selected in WinPV. Save Selected Values will save only the parameters selected into a Value File for later use.

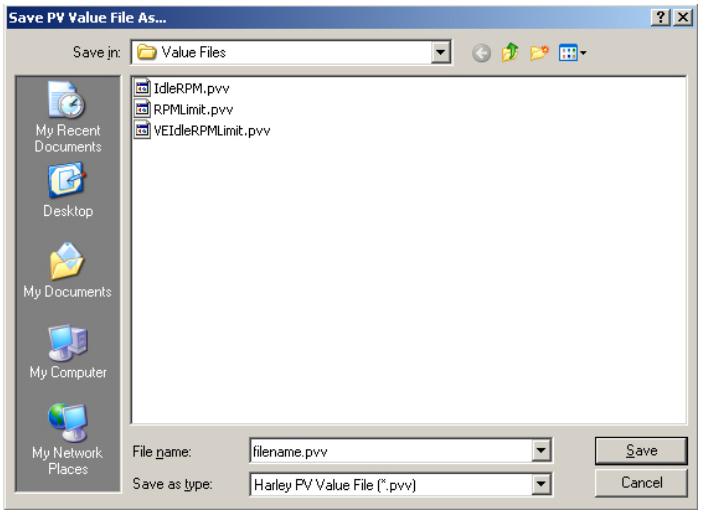
If the Value File directory does not exist, or if you haven't already created the Value File directory, you will need to create a Value File directory in C:\Program Files\Power Vision. Once the Value File directory is created, you must map this folder in Setup Options. Refer to To Setup the Options.

1 Click the box next to the table or tables you would like to save.



2 Select **File >Save Selected Values**.

3 Enter a file name and click **Save**.



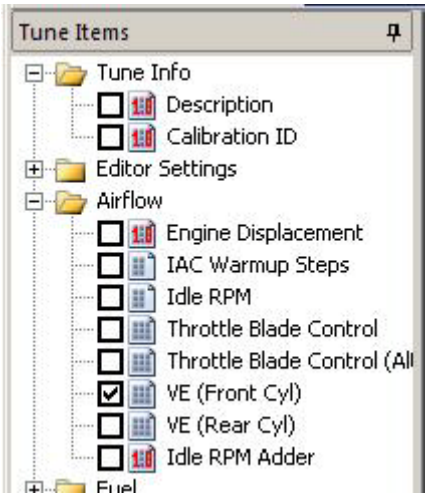
To Save Selected Values—Append

Value Files are one or more tables that are selected in WinPV. Save Selected Values Append creates a new value file using an existing value file as a base. The value file you select changes the cell values in the base file to any cell values that are different in the selected file.

If the Value File directory does not exist, or if you haven't already created the Value File directory, you will need to create a Value File directory in C:\Program Files\Power Vision. Once the Value File directory is created, you must map this folder in Setup Options. Refer to To Setup the Options.

Save Selected Values—Append creates a new value file using an existing value file as a base. The value file you select changes the cell values in the base file to any cell values that are different in the selected file.

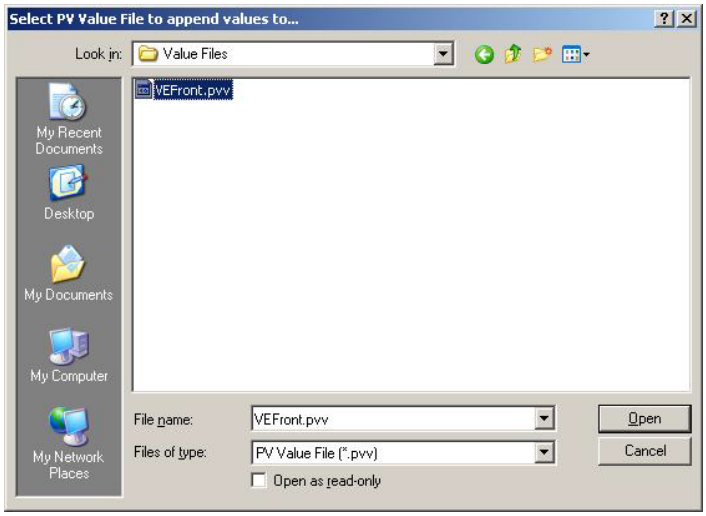
1 Click the box next to the table you would like to save.



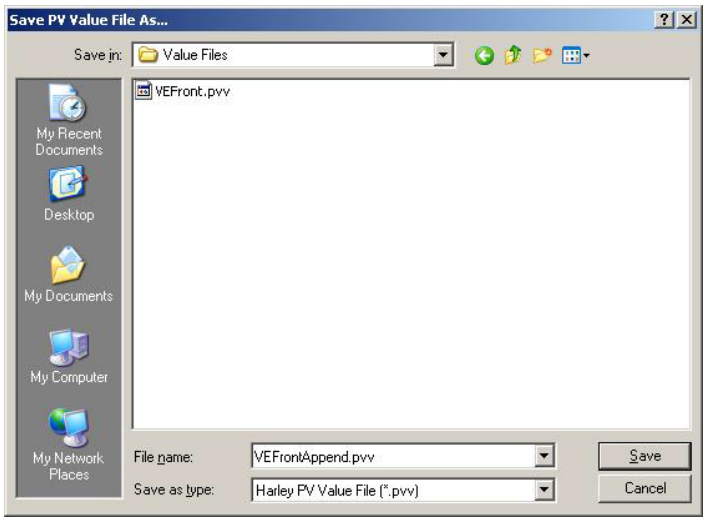
2 Select **File >Save Selected Values—Append**.

3 Browse to your Value File folder and select the value file you wish to append values to.

4 Click **Open**.



5 Enter a name for the new value file and click **Save**.



6 To load the file you created, refer to To Load Selected Values.

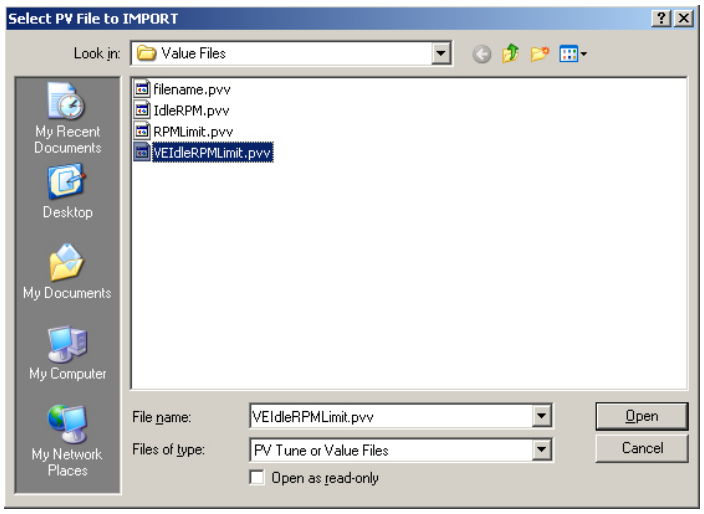
To Load All Values

Load All Values is used for loading in all of the changes in a Value File.

If the Value File directory does not exist, or if you haven't already created the Value File directory, you will need to create a Value File directory in C:\Program Files\Power Vision. Once the Value File directory is created, you must map this folder in Setup Options. Refer to To Setup the Options.

1 Select **File >Load All Values**.

2 Select the .pvv file you would like to use and click **Open**.



3 Click the box next to the tune items you would like to import.

Or

Click **Mark All** to select all the tune items in the list.

Or

Click **Mark Selected** to place a check mark next to the tune items you have selected.

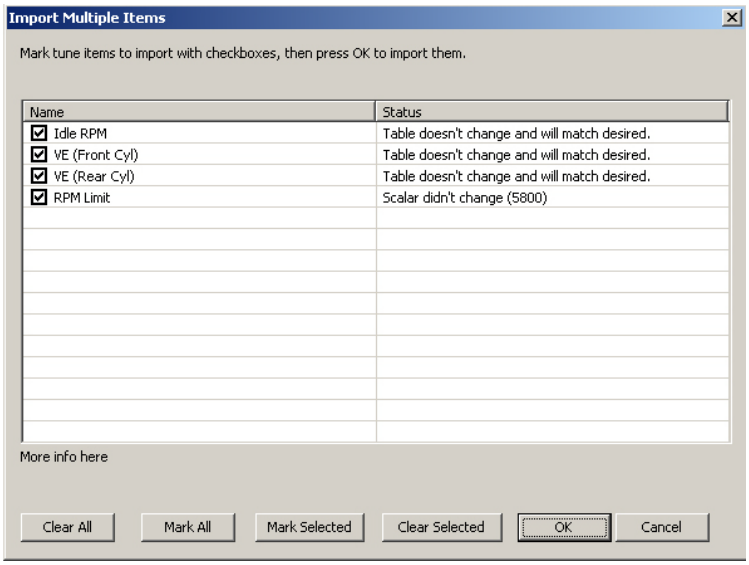
Or

Click **Clear Selected** to clear all of the check boxes.

4 Click **OK** to accept the changes.

Or

Click **Cancel** to close the window.



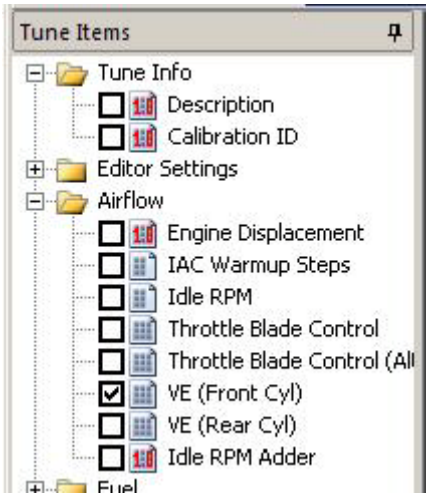
5 Click **OK** to complete the import.

To Load Selected Values

Load Selected Values loads only the values from a value file that are selected in the open tune.

If the Value File directory does not exist, or if you haven't already created the Value File directory, you will need to create a Value File directory in C:\Program Files\Power Vision. Once the Value File directory is created, you must map this folder in Setup Options. Refer to To Setup the Options.

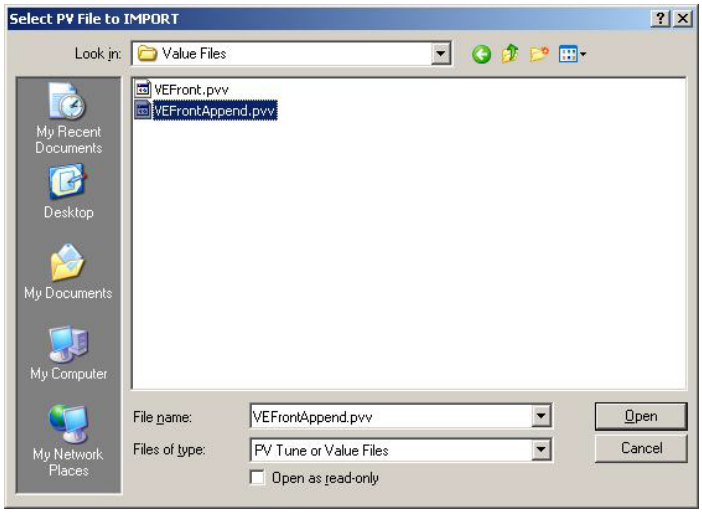
1 Click the box next to the table you would like to load a new value file into.



2 Select **File >Load Selected Values**.

3 Browse to your Value File folder and select the value file you wish to load.

4 Click **Open**.



5 Click the box next to the tune items you would like to import.

Or

Click **Mark All** to select all the tune items in the list.

Or

Click **Mark Selected** to place a check mark next to the tune items you have selected.

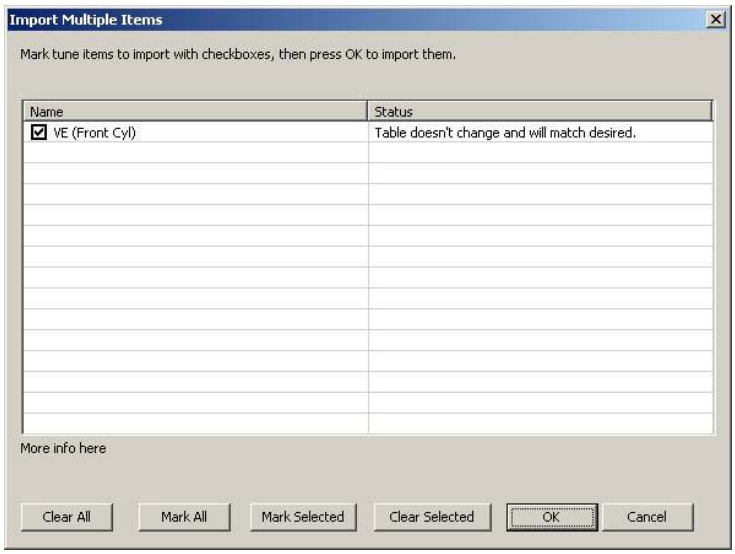
Or

Click **Clear Selected** to clear all of the check boxes.

6 Click **OK** to accept the changes.

Or

Click **Cancel** to close the window.



7 Click **OK** to complete the import.

To Exit the WinPV Software

Select **File >Exit** to exit the WinPV software.

Edit Menu

To Undo

Select **Edit >Undo** to take a step back and undo the last changes made to the tune.

To Redo

Select **Edit >Redo** to reverse an action you undid.

To Cut/Copy/Paste Selected Values

1. Select the desired values.
2. Select **Edit >Cut** to cut the selected values.
3. Select **Edit >Copy** to copy the selected values.
4. Select **Edit >Paste** to paste the copied values.

To Smooth Selected Values

Smoothing is a process that removes the sharp peaks and troughs from a data series or surface map. Smoothing is designed to smooth data after modifications have been made.

1. Select the desired values. You must select at least two cells.
2. Select **Edit >Smooth** to smooth the selected values.

To Interpolate Selected Values

Interpolate is a function that applies a linear interpolation to the values within the range of selected cells. This function will also construct new values within the range of selected cells when surrounded by valid values (positive or negative integers).

1. Select the desired values. You must select at least three cells.
2. Select **Edit >Interpolate** to interpolate the selected values.

To Interpolate Selected Horizontal Values

1. Select the desired values. You must select at least three cells that are horizontal.
2. Select **Edit >Interpolate Horizontal** to interpolate the selected values.

To Interpolate Selected Vertical Values

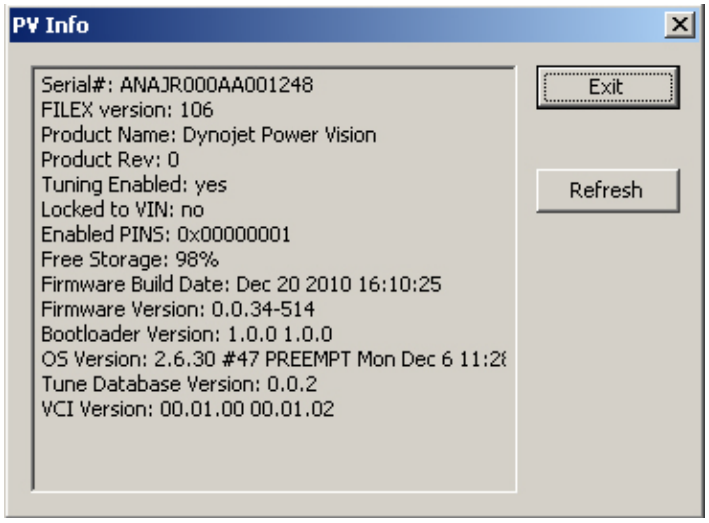
1. Select the desired values. You must select at least three cells that are vertical.
2. Select **Edit >Interpolate Vertical** to interpolate the selected values.

PowerVision Menu

To View the PowerVision Information

1. Select **PowerVision >PV Info** or click the Info button

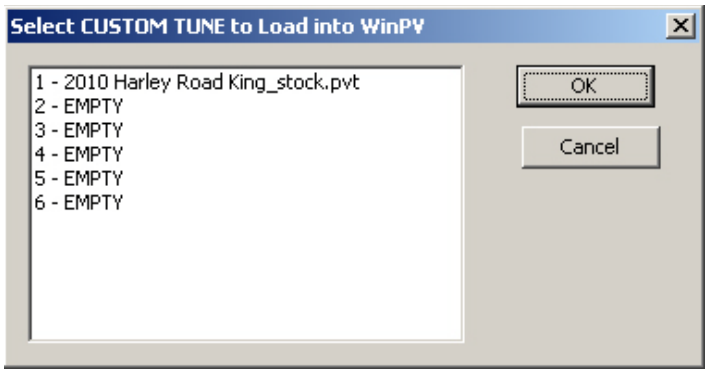
.
2. Click **Refresh** to refresh the information displayed.
3. Click **Exit** to exit the PV Info window.



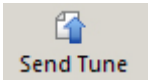
To Get a Tune from the Power Vision

1. Select **PowerVision >Get Tune from PV** or click the Get Tune button

.
2. Select a tune to load.
3. Click **OK**.



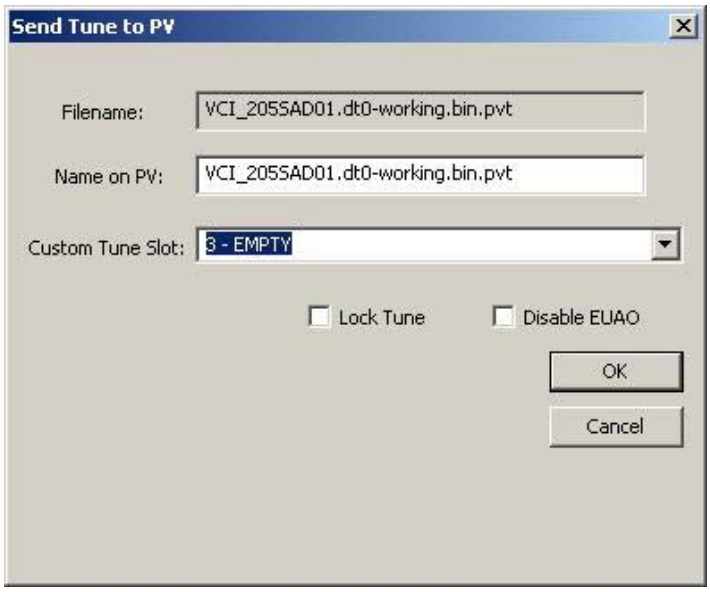
To Send a Tune to the Power Vision

1. Select **PowerVision >Send Tune to PV** or click the Send Tune button 

.
2. Using the drop-down arrow, select a Custom Tune Slot on the Power Vision to send the tune to.
3. Click **Lock Tune** to prevent a tune from being retrieved using Get Tune.
4. Click **Disable EUAO** to disable the End User Adjustable Options. This will prevent a tune from being edited on the Power Vision.
5. Click **OK** to send the tune to the Power Vision.

   Or

   Click **Cancel** to close the window without changes.



To Get a Log from the Power Vision

1 Select **PowerVision >Get Log from PV** or click the Get Log button

.

2 Select the log file you wish to get from the Power Vision.

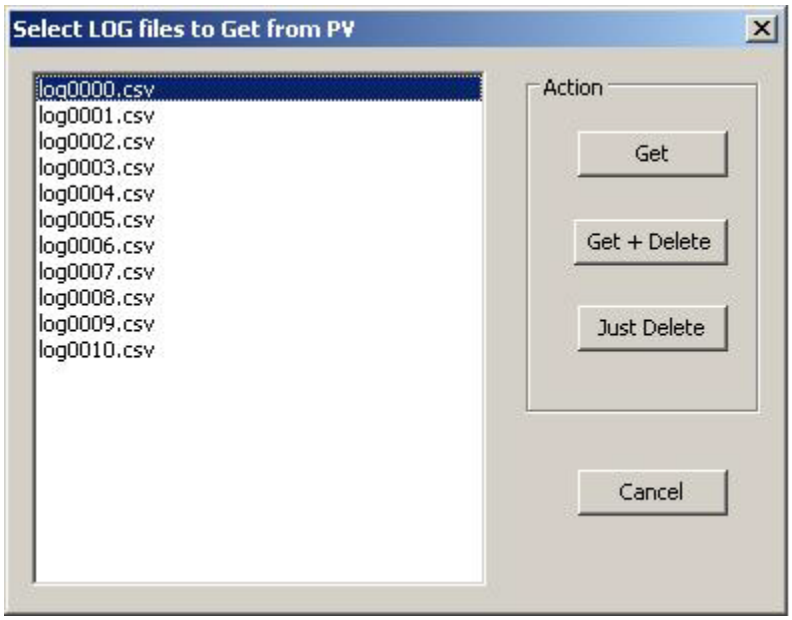
3 Click **Get** to get the log file from the Power Vision.

Or

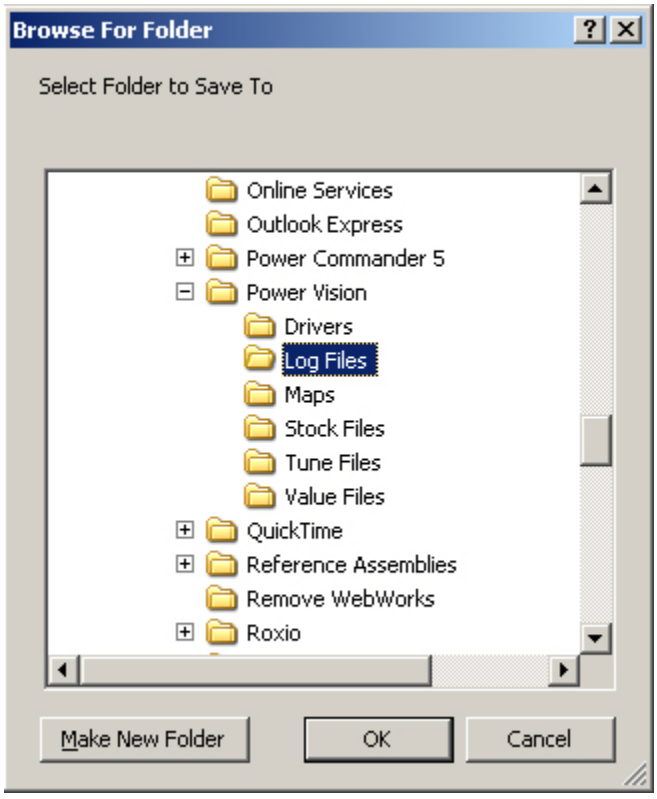
Click **Get + Delete** to get and delete the log file from the Power Vision.

Or

Click **Just Delete** to delete the log file from the Power Vision.

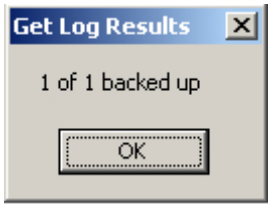


4 Browse to the location you wish to save your log file and click **OK**.



5 Click **OK**.

The log file is now ready to be opened with Excel.



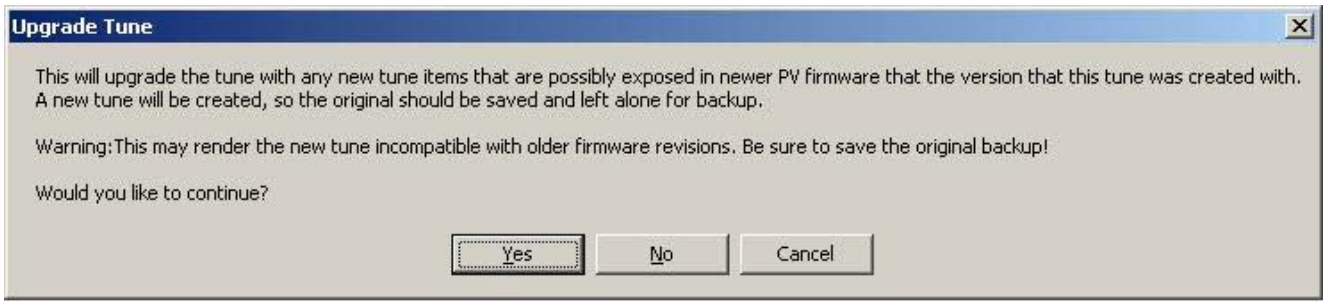
To Update the Tune Using the Power Vision

Update the Tune Using the Power Vision will upgrade the tune with any new tune items that are possibly exposed in newer Power Vision firmware that the version that this tune was created with.

A new tune will be created, so the original tune should be saved and left alone for backup.

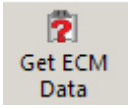
> **Note:**This may render the new tune incompatible with older firmware revisions. Be sure to save the original backup.

1. Select **PowerVision >Update Tune Using PV**.
2. Click **Yes** to continue.

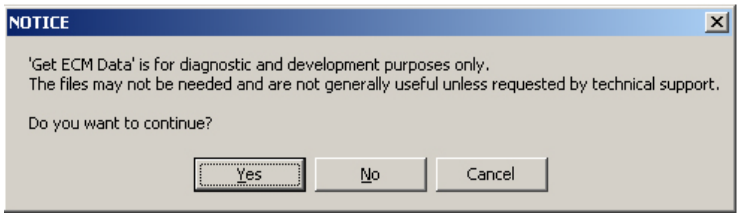

Upgrade Tune
This will upgrade the tune with any new tune items that are possibly exposed in newer PV firmware that the version that this tune was created with.
A new tune will be created, so the original should be saved and left alone for backup.
Warning:This may render the new tune incompatible with older firmware revisions. Be sure to save the original backup!
Would you like to continue?
Yes
No
Cancel

To Get ECM Data from the Power Vision

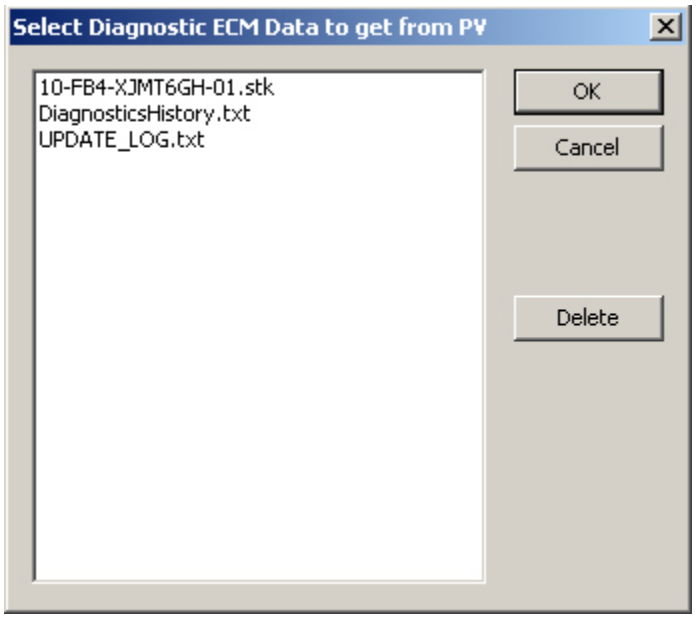
Get ECM Data is for diagnostic and development purposes only. The files may not be needed and are not generally useful unless requested by technical support.

1. Select **PowerVision >Diagnostic/Test Functions >Get ECM Data (Diagnostic) from PV** or click the Get ECM Data button 

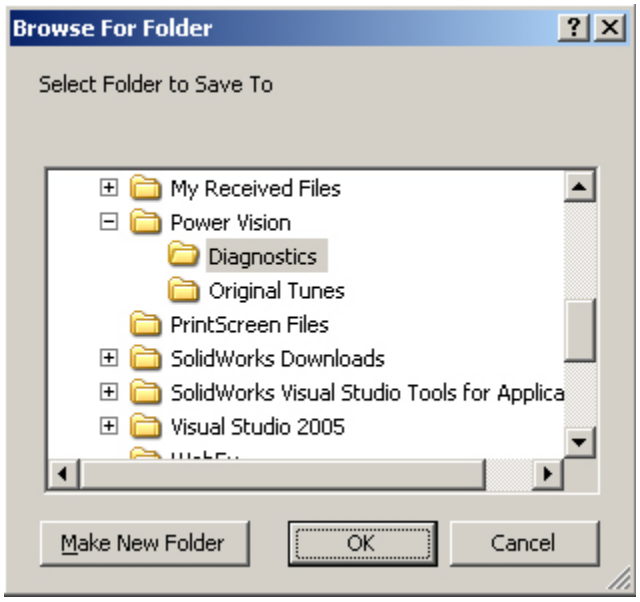
.
2. Click **Yes** to continue.


NOTICE
'Get ECM Data' is for diagnostic and development purposes only.
The files may not be needed and are not generally useful unless requested by technical support.
Do you want to continue?
Yes
No
Cancel

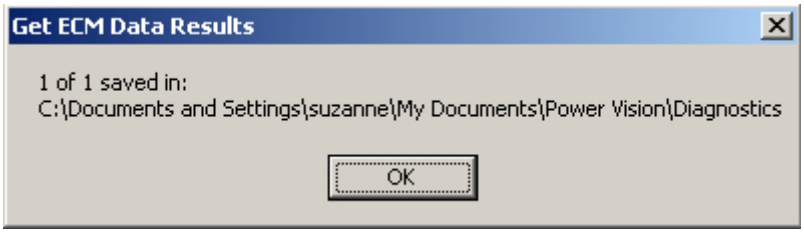
3 Select the diagnostic ECM data to get from the Power Vision and click **OK**.



4 Browse to the folder you want to save the diagnostic file to and click **OK**.



5 The Get ECM Data Results have been saved. Click **OK**.

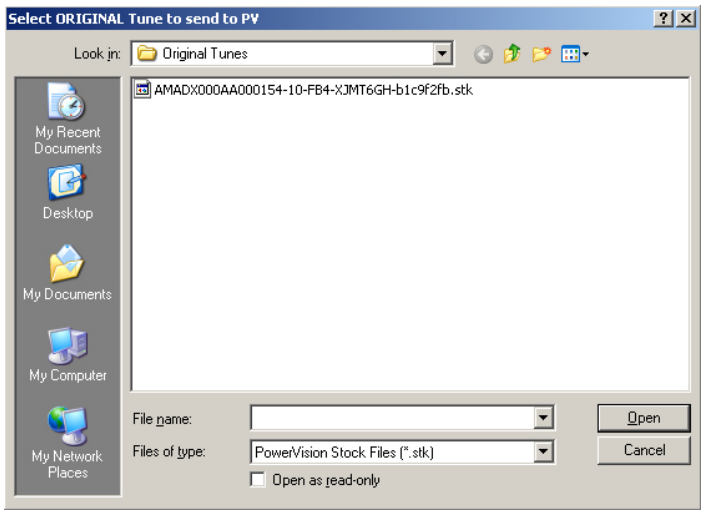


To Send the Original Tune to the Power Vision

1 Select **PowerVision >Diagnostic/Test Functions >Send Original Tune to PV**.

2 Browse to the location of the original tune you would like to send to the Power Vision.

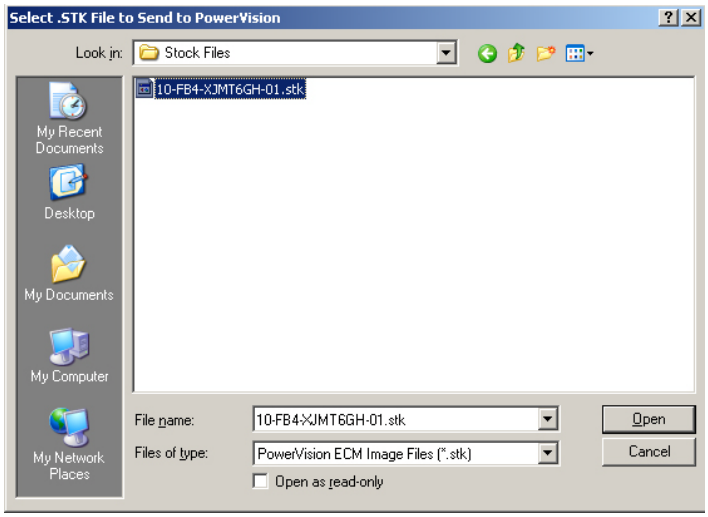
3 Select the tune file and click **Open**.



4 Click **OK**.

To Send a Stock File to the Power Vision

1. Select **PowerVision >Diagnostic/Test Functions >Send .STK File to PV**.
2. Browse to the location of the stock file you would like to send to the Power Vision.
3. Select the stock file and click **Open**.



4. Click **OK**.

To Exit PC Link Mode

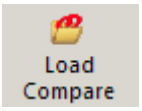
Exit PC Link Mode allows you to edit gauge features while plugged into the PC using the supplied USB cable.

Select **PowerVision >Diagnostic/Test Functions >Exit PC Link Mode**.

Compare Menu

To Load a Compare File

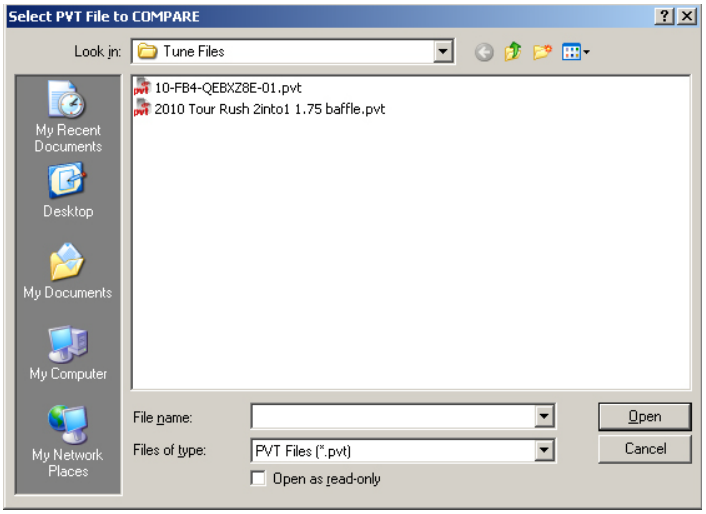
Compare file allows the individual tune items of two different tune files to be compared. The Active file can be edited, cell values can be copied from the Compare file, and the Delta feature can be used to change the Active file. For more information about the Delta file, refer to To View Delta.

1 Select **Compare >Load Compare** or click the Load Compare button 

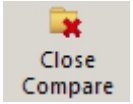
.

2 Select a tune file to Compare.

3 Click **Open**.



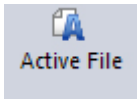
To Close the Compare File

Select **Compare >Close Compare** or click the Close Compare button 

. This will close the Compare File and return to a single active tune file.

To View the Active File

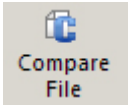
Active File allows you to view the active file when comparing two tune files.

Select **Compare >Active File** or click the Active File button 

.

To View the Compare File

Compare File allows you to view the loaded compare file when comparing two tune files. The Compare File cannot be edited.

Select **Compare >Compare File** or click the Compare File button 

.

To View Delta

Delta shows the difference between the active file and the compare file for the tune item you have selected.

By editing the delta file, you can change the active file. For example, if one of the cells in the delta file is 10 and you change it to 15, the corresponding cell in the active file will change by 5.

In Delta, a positive number indicates the value in the compare file is larger than the value in the active file.

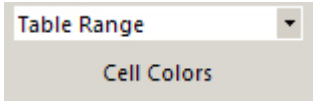
Hover the mouse pointer over a cell to view the comparison of the numbers. Active number is first then the compare number.

3.0	-6.1	-12.4	-10.3	-13.6
9.2	-7.8	-8.2	-9.2	-13.1
6.9	89.5 vs comparison of 94.3			-3.9
6.3	6.0	1.3	2.7	1.4
1.0	-1.0	1.1	0.2	-2.2
2.4	-5.4	-5.8	-2.3	-3.6

Select **Compare >Delta** or click the Delta button

.

To Choose Cell Colors

1 Click the Cell Colors button 

.

2 Using the drop-down arrow, select the cell color option from the list.

None—uses no colors.

Table Range—uses colors from blue to red based on lowest to highest numbers in the table.

Modified—must have a compare file loaded to use.

Compare High/Low—uses colors to represent the differences between the compare files. White is no difference while blue is the largest difference. Compare High/Low is only available when a compare file is loaded.

To Show Only Differences

Show Only Differences allows you to view only the tune items with differences in the tune items.

Select **Compare >Show Only Differences**.

To Show Delta As Percent

Show Delta as Percent allows you to view the differences as a percent.

Select **Compare >Show Delta As Percent**.

To Create Difference Report

Create Difference Report allows you to create a text file containing the tune items and the differences between the Active file and the Compare file.

Select **Compare >Create Difference Report**.

Setup Menu

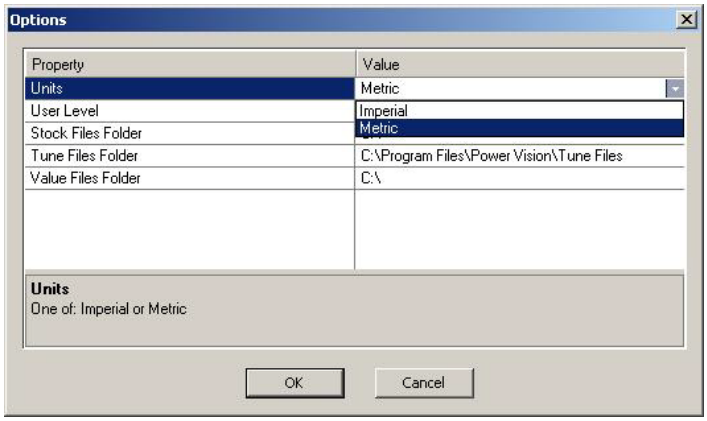
To Setup the Options

1 Select **Setup >Options**.

2 To change the Units:

2a Using the drop-down arrow, select either Metric or Imperial.

2b Click **OK** to accept the changes.

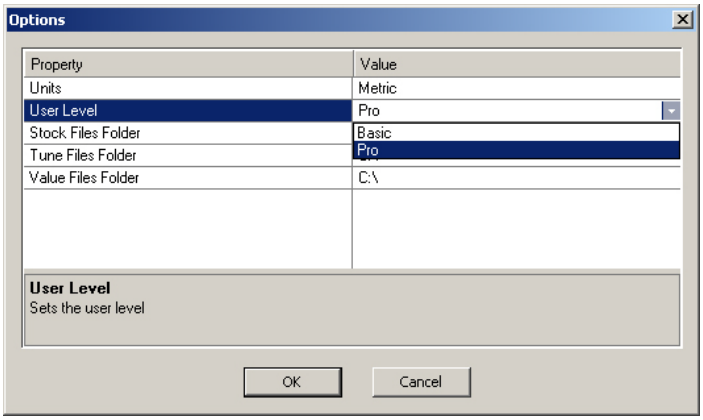


3 To change the User Level:

3a Using the drop-down arrow, select either Basic or Pro.

3b Click **OK** to accept the changes.

Pro User Level will expose additional tune items and parameters which can affect the operating condition of the vehicle.

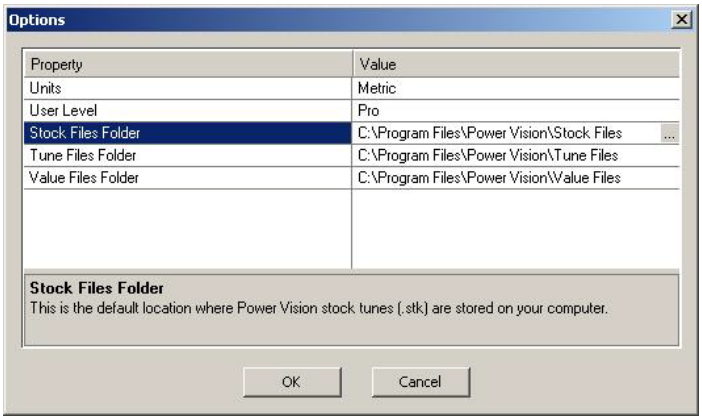


4 To create the default location where the Power Vision stock files (.stk) are stored on your computer:

4a Create a Stock Files directory in C:\Program Files\Power Vision.

4b Click **. . .** to browse to the Stock Files folder you created.

4c Click **OK** to save the location.

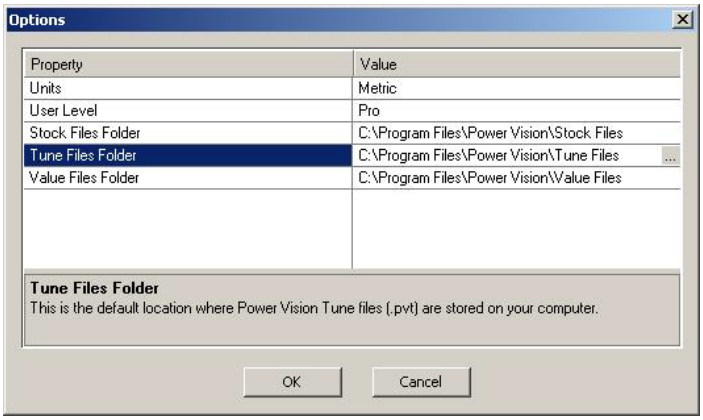


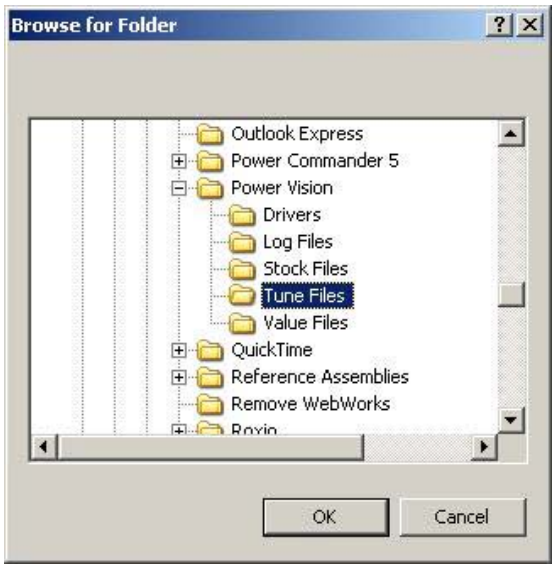
5 To create the default location where the Power Vision tune files (.pvt) are stored on your computer:

5a Create a Tune Files directory in C:\Program Files\Power Vision.

5b Click **. . .** to browse to the Tune Files folder you created.

5c Click **OK** to save the location.



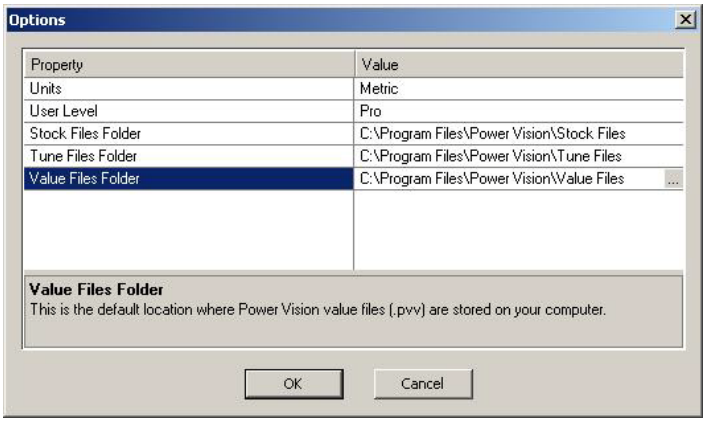


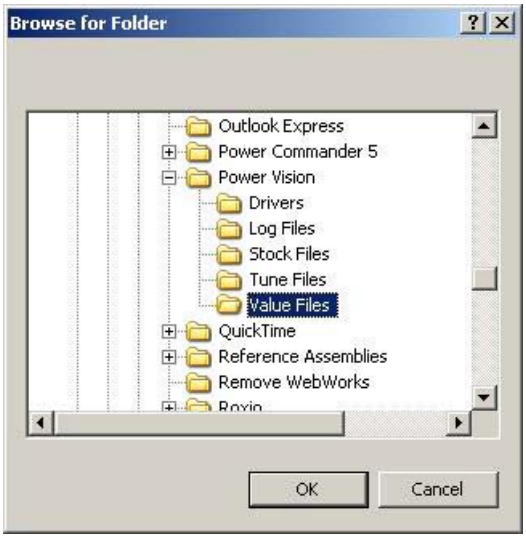
6 To create the default location where the Power Vision value files (.pvv) are stored on your computer:

6a Create a Value Files directory in C:\Program Files\Power Vision.

6b Click **. . .** to browse to the Value Files folder you created.

6c Click **OK** to save the location.





To Apply the License

Apply License is used to enable features in the Power Vision and WinPV software that have been provided to you by Dynojet.

Select **Setup >Apply License**.

View Menu

To View the Standard Toolbar

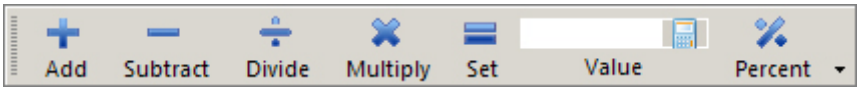
Select **View >Standard Toolbar** or right-click to turn the toolbar on and off.

For more information about the Standard Toolbar, refer to Standard Toolbar.

To View the Cell Math Toolbar

Select **View >Cell Math Toolbar** or right-click to turn the toolbar on and off.

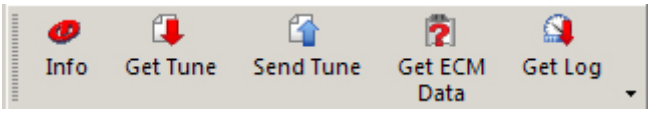
For more information about the Cell Math Toolbar, refer to Cell Math Toolbar.



To View the PowerVision Toolbar

Select **View >PV Toolbar** or right-click to turn the toolbar on and off.

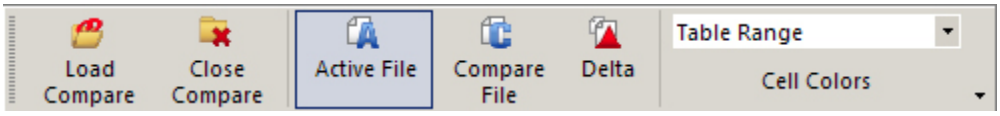
For more information about the PV Toolbar, refer to PowerVision Toolbar.



To View the Compare Toolbar

Select **View >Compare Toolbar** or right-click to turn the toolbar on and off.

For more information about the Compare Toolbar, refer to Compare Toolbar.



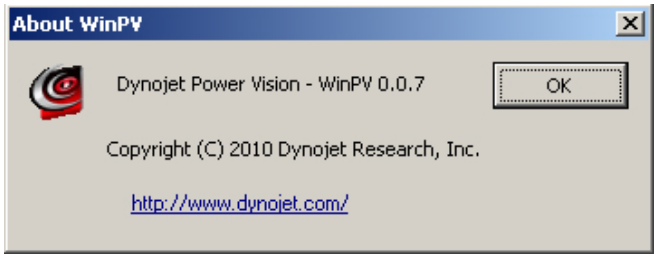
To Reset the User Interface

Select **View >Reset UI**.

Help Menu

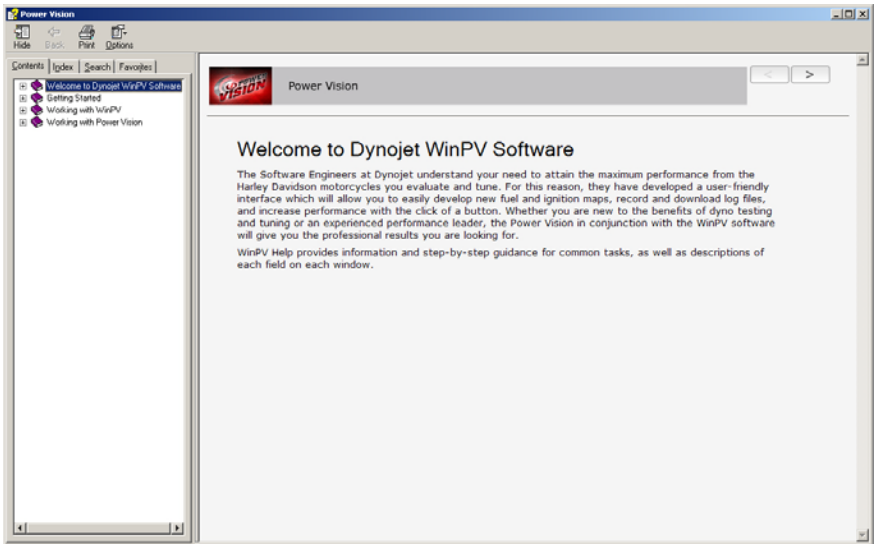
To View the About Window

Select **Help >About**.



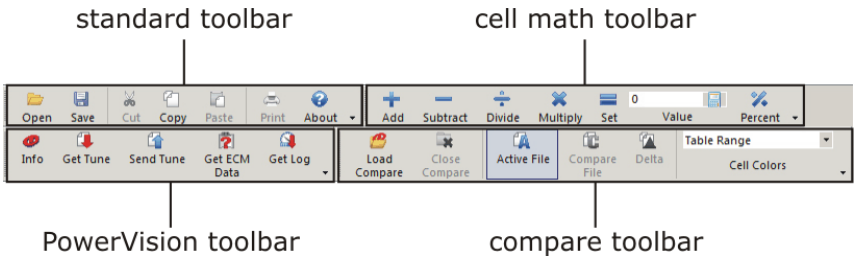
To View the Power Vision Help Files

Select **Help >Contents**.


Power Vision
Hide
Back
Print
Options
Contents
Index
Search
Favorites
Welcome to Dynojet WinPV Software
Getting Started
Working with WinPV
Working with Power Vision
Power Vision
Welcome to Dynojet WinPV Software
The Software Engineers at Dynojet understand your need to attain the maximum performance from the Harley Davidson motorcycles you evaluate and tune. For this reason, they have developed a user-friendly interface which will allow you to easily develop new fuel and ignition maps, record and download log files, and increase performance with the click of a button. Whether you are new to the benefits of dyno testing and tuning or an experienced performance leader, the Power Vision in conjunction with the WinPV software will give you the professional results you are looking for.
WinPV Help provides information and step-by-step guidance for common tasks, as well as descriptions of each field on each window.

WinPV Toolbar

The following toolbar is always shown contains the WinPV tools. The WinPV toolbar is grouped into four sections and each toolbar can be customized.



[Standard Toolbar](#)

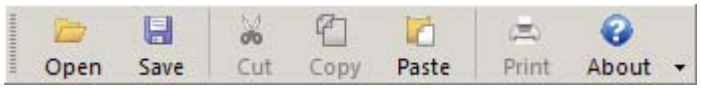
[PowerVision Toolbar](#)

[Cell Math Toolbar](#)

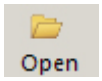
[Compare Toolbar](#)

[Customizing the Toolbars](#)

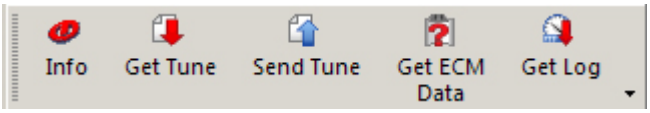
Standard Toolbar



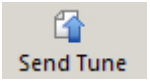
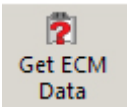
A description of the standard toolbar buttons and functions follows.

press this button	to
	Open previously saved or stored tunes. Refer to To Open a Power Vision Tune File (.PVT).
	Save the current tune to your computer. Refer to To Save a Power Vision Tune File (.PVT).
	Cut the highlighted cell values.
	Copy the highlighted cell values.
	Paste the copied values.
	About allows you to view information about WinPV.

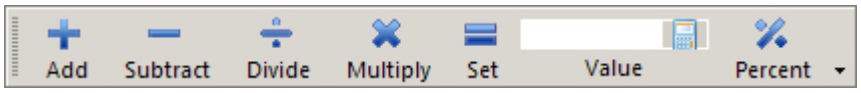
PowerVision Toolbar



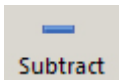
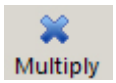
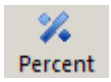
A description of the Power Vision toolbar buttons and functions follows.

press this button	to
	Display the Power Vision information. Refer to To View the PowerVision Information.
	Retrieve a tune from the Power Vision. The tune information will be shown in the Tune Items. Refer to To Get a Tune from the Power Vision.
	Sends the current tune to the Power Vision. Refer to To Send a Tune to the Power Vision.
	Get ECM Data is for diagnostic and development purposes only. The files may not be needed and are not generally useful unless requested by technical support. Refer to To Get ECM Data from the Power Vision.
	Retrieve the log files on the Power Vision. Refer to To Get a Log from the Power Vision.

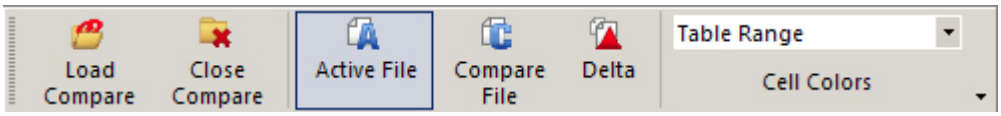
Cell Math Toolbar



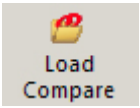
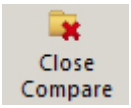
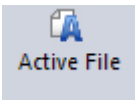
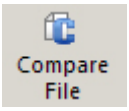
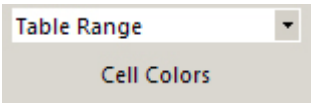
A description of the cell math toolbar buttons and functions follows.

press this button	to
	Add the numbered entered into the Value field to the selected cells.
	Subtract the numbered entered into the Value field from the selected cells.
	Divide the selected cells by the numbered entered into the Value field.
	Multiply the selected cells by the numbered entered into the Value field.
	Set changes the selected cells to the numbered entered into the Value field.
	Use the Value field to enter the number you wish to change the selected cells by.
	Percent changes the selected cells by the numbered entered into the Value field.

Compare Toolbar



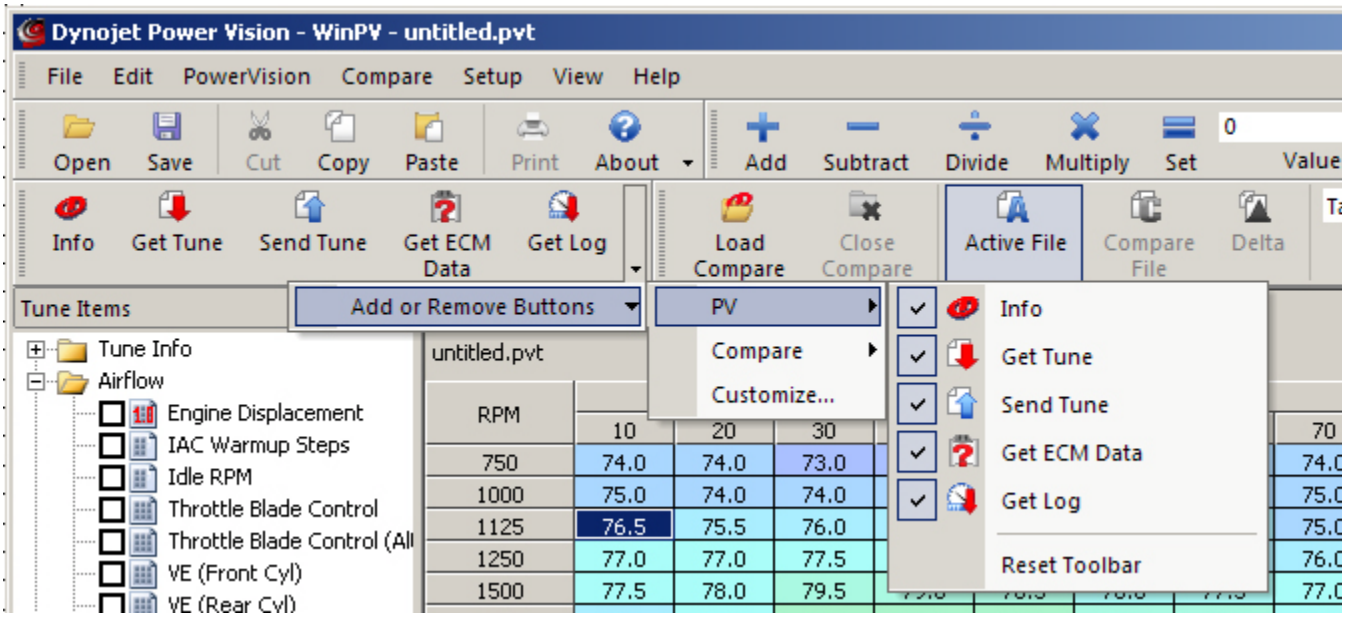
A description of the compare toolbar buttons and functions follows.

press this button	to
	Load a tune file previously saved on your computer as the compare file. Refer to To Load a Compare File.
	Close the compare file and return to a single active tune file.
	Active File allows you to view the active file when comparing two tune files. Refer to To View the Active File.
	Compare File allows you to view the loaded compare file when comparing two tune files. The Compare File cannot be edited. Refer to To View the Compare File.
	Show the difference between the active file and the compare file for the tune item you have selected. Refer to To View Delta.
	Change the colors of the cells in the table. Refer to To Choose Cell Colors.

Customizing the Toolbars

The buttons on each toolbar can be customized to suit your individual needs.

1. Click the arrow found at the end of a toolbar.
2. Select which toolbar you wish to customize.
3. Select which buttons you wish to appear or not appear on the toolbar.

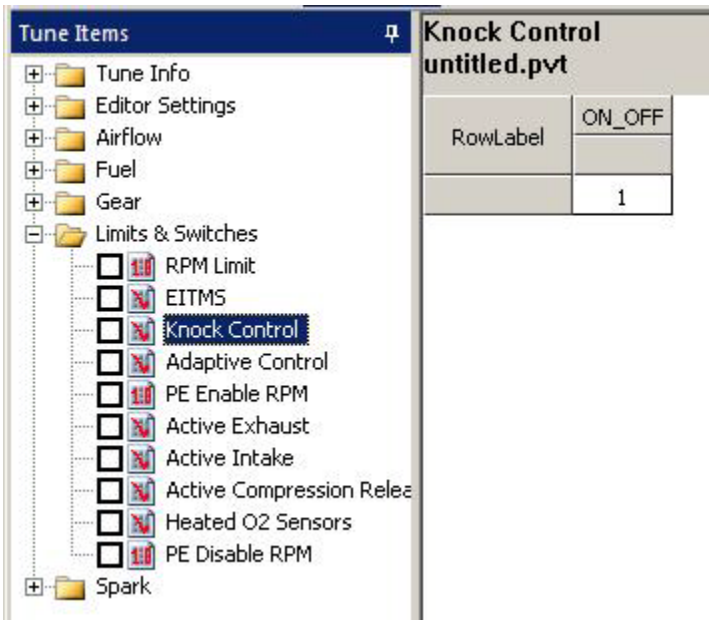


Tune Items

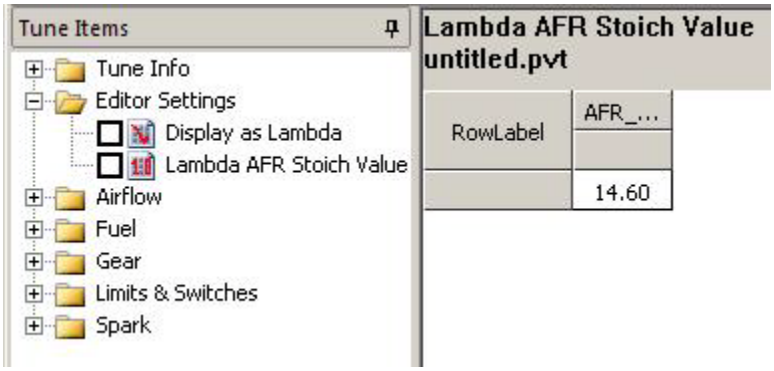
Tune Items shows the available values, parameters, and tables. All of these values affect the way the vehicle performs.

Tune Items fall into one of the three categories:

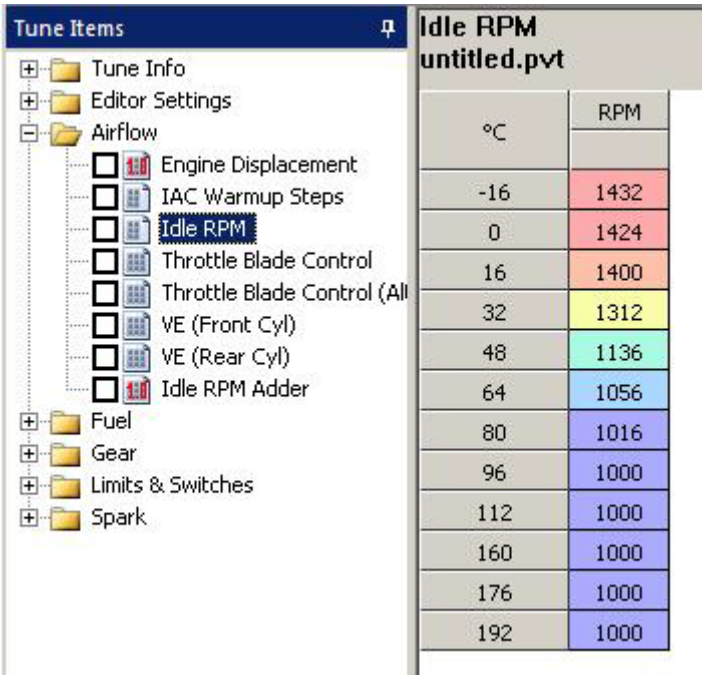
- Switch—values that are either on/off, yes/no, true/false, 0/1, etc.



- Scalar—values that are a single number.

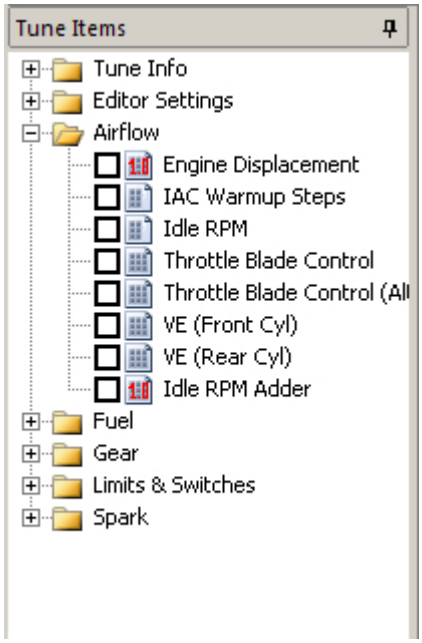


- Tables—values that are displayed in multiple columns and/or rows.



Click the plus sign (+) to expand the items; click the minus sign (-) to compress the items.

Click on the desired tune item to view that item. Many tune items are described in this section.

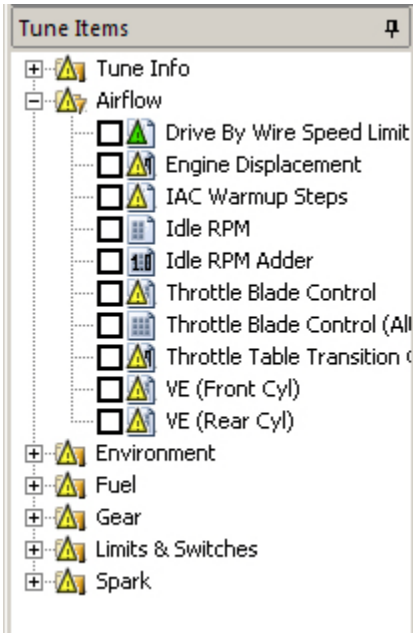


When using the compare feature, a colored flag may be visible next to certain tune items. These visual identifiers helps you distinguish parameters that don't match when using the compare feature. Visual identifiers offer a quick and easy way to identify where the tune has changed.

You must have a compare file open to use the visual identifiers. For more information about the compare feature, refer to To Load a Compare File.

There are three visual identifiers:

- Yellow Flag—different.
- Green Flag—does not exist in the compare file, but does exist in the active file.
- Red Flag—exists in the compare file, but does not exist in the active file.



Tune Info

tune item	description
Description	This is the vehicle and ECM description. Displays Year, Make, Model, Vin and ECM part number.
Calibration ID	This is the stock ECM calibration ID number.
Software Level	This is the ECM software.
Lambda Based	This indicates if this is a Lambda bases calibration. Not editable.

Airflow

tune item	description
Charge Dilution Effect (Front Cyl)	This estimates the increase in intake pressure that is due to Charge Dilution Effect for the front cylinder. Expressed as 0=0% and 256=~2%.
Charge Dilution Effect (Rear Cyl)	This estimates the increase in intake pressure that is due to Charge Dilution Effect for the rear cylinder. Expressed as 0=0% and 256=~2%.
Charge Dilution Effect	This estimates the increase in intake pressure that is due to Charge Dilution Effect for both cylinders. Expressed as 0=0% and 256=~2%.
Drive By Wire Throttle Limit vs Gear	These values are used by Drive By Wire (DBW) engine speed governing. In most cases, these values should be changed to 255 in order to ensure the desired rev limit is actually used. When the rev limit is approaching, DBW bikes nudge the throttle towards this position, specified for each gear. 0=Throttle Closed, 255=Throttle Wide Open (100% TP). Set these to 255 to remove this limit or to a value that works with your desired rev limit.
Engine Displacement	This value is the displacement of both cylinders. When changing engine size it's easier to ratio this value up and down by the difference in displacement. Input the actual engine displacement into this field. Available in pro user level only.
IAC Warm-up Steps	The Intake Air Control Warm-up Steps table is used to maintain a stable idle during warm-up. This table determines the initial position of the IAC motor to maintain RPM at a given temperature. The closer this table is to the actual IAC opening the better the idle will be. Available in pro user level only.

tune item	description
Idle RPM	The Idle speed is controlled by the idle RPM table as a function of engine temp. To increase idle make these values larger. To decrease idle make these values smaller. Available in pro user level only. Setting Idle RPM below 900 RPM can cause oil pressure to drop.
MAP Load Normalization	This normalizes the MAP reading to better represent LOAD, in a range 0-100. You do a WOT run through the RPM range and record MAP, then you set this table so that the same test would then read 100 across the board.
MAP Tooth IVC (Front Cyl)	This defines when the primary MAP reading is taken. This should be set to the crank tooth number near intake valve closing for the front cylinder.
MAP Tooth IVO (Front Cyl)	This defines when the MAP reading used for Charge Dilution Effect is taken, which smooths out the VE table at low loads. This should be set to be the crank tooth number just before intake valve opening for the front cylinder.
MAP Tooth Offset (Rear Cyl)	This is how many crank teeth to offset the MAP Tooth IVC and MAP Tooth IVO teeth for the rear cylinder. This is not editable.
MAP Default Table	The MAP Default table gives normalized VE values in the event the MAP sensor fails.
Number of Crank Teeth	The number of reference teeth on the flywheel including the gap. This not editable. 32=Big Twin, 24=VROD
Throttle Blade Control (Stage II)	This is used in drive by wire systems. This table represents the desired throttle percent as a function of RPM. Throttle Blade Control (Stage II) is used once the throttle transition gear has been reached. Drive by wire Harleys use two throttle blade control tables. To use Throttle Blade Control (Stage II) exclusively, set Throttle Transition Gear to 0.
Throttle Blade Control (Stage I)	This is used in drive by wire systems. This table represents the desired throttle percent as a function of RPM. Throttle Blade Control (Stage I) is used until the throttle transition gear has been reached. Drive by wire Harleys use two throttle blade control tables. To use Throttle Blade Control (Stage I) exclusively set Throttle Transition Gear to 6.
VE (Front)	The Volumetric Efficiency (Front) table is for the front cylinder and is the table that models engine airflow so AFR can be accurately calculated. The values in this table are influenced by the camshaft, exhaust system, head design, engine displacement and air filter. This is the most critical item that must be correct in order to make the bike run correctly. To increase fuel make the values larger. To decrease fuel make the values smaller.

tune item	description
VE (Rear)	The Volumetric Efficiency (Rear) table is for the rear cylinder and is the table that models engine airflow so AFR can be accurately calculated. The values in this table are influenced by the camshaft, exhaust system, head design, engine displacement and air filter. This is the most critical item that must be correct in order to make the bike run correctly. To increase fuel make the values larger. To decrease fuel make the values smaller.
Idle RPM Adder	This is an idle speed RPM adder. Positive values will add RPM to the entire IDLE RPM Function, while negative values will reduce RPM.
Throttle Table Transition Gear	This is the gear that Throttle Blade Control Table (Stage I) will transition to Throttle Blade Control. To use the throttle blade control table only, change this value to 0.
DBW Throttle Position Limit	When the Rev Limit is approaching, Drive By Wire (DBW) bikes nudge the throttle towards this position, specified for each gear. Set these to 100% to remove this limit or to a value that works with your desired rev limit.
Drive By Wire Speed Limit vs Gear	This is the speed limit for vehicle protection based on gear. Set this to what you want the vehicle speed limit to be in gears one through six.

Environment

tune item	description
EITMS On Temperature	The Engine Idle Temperature Management System (EITMS) On Temp reduces heat buildup during prolonged idling times and controls heat buildup in two stages: Mode 1–AFR Enrichment is activated when the engine temperature exceeds 142°C (Sportsters 230 °C) and the engine RPM is less than 1200 RPM. Mode 2–Skip Fire (Big Twins only) activates if Mode 1 is active and the engine temperature exceeds 155°C and the vehicle speed is less than 1-2 KPH. Note: Sportster temperatures are much higher due to the location of the temperature sensor and only uses EITMS Mode 1 (AFR Enrichment). When Mode 2 Skip Fire is active, additional steps are added to the IAC. Built motors may requiring adding steps to this.
EITMS Off Temperature	The Engine Idle Temperature Management System (EITMS) Off Temperature reduces heat buildup during prolonged idling times and controls heat buildup in two stages: Mode 1–AFR Enrichment is activated when the engine temperature exceeds 142°C (Sportsters 230 °C) and the engine RPM is less than 1200 RPM. Mode 2–Skip Fire (Big Twins only) activates if Mode 1 is active and the engine temperature exceeds 155°C and the vehicle speed is less than 1-2 KPH. Note: Sportster temperatures are much higher due to the location of the temperature sensor and only uses EITMS Mode 1 (AFR Enrichment). When Mode 2 Skip Fire is active, additional steps are added to the IAC. Built motors may requiring adding steps to this.
Knock Control Minimum Temperature	Knock Control will be activated at temperatures greater than this setting. Set to a high value, like 310°C, to disable knock control all the time.
Knock Control Minimum Temperature Hysteresis	Knock Control will be de-activated at temperatures lower than this setting. Set this to Knock Control Minimum Temperature minus ~2°C.
Adaptive Control Enable Temperature	Adaptive Control will be enabled at temperatures greater than this setting. Available in pro user level only.
Adaptive Control Maximum Temperature	Adaptive Control will be disabled at temperatures higher than this setting. Set to a high value, like 310°C to remove the hot limit. Also set "Adaptive Control Maximum Temperature Hysteresis" to be 5°C below this.

tune item	description
Adaptive Control Minimum Temperature Hysteresis	If the engine temperature gets too cold (drops below this setting), adaptive learning will be disabled. This is usually set to "Adaptive Control Minimum Temperature" minus a small amount for hysteresis, 5°C.
Adaptive Control Maximum Temperature Hysteresis	Adaptive Control will be re-enabled when a hot engine cools to below this setting. This is usually set to "Adaptive Control Maximum Temperature" minus 5°C.
Closed Loop Minimum Temperature	Closed loop will be enabled at temperatures greater than this setting. To disable closed loop completely, set this value to a high temperature, like 310°C (590°F).
Closed Loop Minimum Temperature Hysteresis	Closed loop will be disabled when the engine drops below this temperature. This is usually set to "Closed Loop Minimum Temperature" minus a small amount for hysteresis, 1-5°C.

Fuel

tune item	description
Injector Size	Fuel injector flow base value in grams per second. This value will need to be changed for larger injectors. 1 gram per second equals 7.94 pounds per hour. 1 pound per hour equals 0.126 grams per second. Available in pro user level only. Example 1: injectors that are 4.35 grams per second are 34.5 pounds per hour. Multiply 4.35 x 7.94 = 34.5. Example 2: injectors that are 42 pounds per hour are 5.29 grams per second. Multiply 42 x 0.126 = 5.29.
Air-Fuel Ratio (Lambda)	The main Lambda table directly controls fuel delivered to the engine. Values at or near the stoichiometric ratio for gasoline (14.64:1, which is equivalent to a lambda value of 1) will yield the best fuel economy. Lower values will result in a richer condition, which is required for higher load/higher RPM ranges. The preferred values for best power and torque are between .86 and .92 depending on the engine combination. Normally, using values between .98 and 1.02 allows the ECM to maintain closed loop fuel control. Example: lambda of 1=14.64 AFR for gas. Lambda of .89=13:1 AFR (14.64x.89=13.02). Note: Lambda is independent of fuel type.
Acceleration Enrichment	Acceleration Enrichment mode can be triggered by a sudden change in throttle position or an increase in MAP pressure. To increase the fuel delivered, increase the values.
Air-Fuel Ratio (Stoich)	The main Air-Fuel table directly controls fuel delivered to the engine. Values at or near the stoichiometric ratio for gasoline (14.64:1) will yield the best fuel economy. Lower values will result in a richer condition, which is required for higher load/higher RPM ranges. The preferred values for best power and torque are between 12.6 and 13.4 depending on the engine combination. Using a value of 14.6 enables the ECM's ability to maintain closed loop fuel control.
Cranking Fuel	Cranking Fuel is a multiplier based on engine temperature. A larger number will supply more fuel during the cranking cycle. A smaller number will reduce the amount of cranking fuel during the cranking cycle. Cranking Fuel only applies to starting the engine (when the starter is active).
Deceleration Enleanment	Deceleration Enleanment mode can be triggered by a sudden decrease in throttle position or MAP pressure. To increase the fuel delivered on deceleration, decrease the value. To reduce the amount of fuel delivered increase the value.

tune item	description
PE Air Fuel Ratio (Lambda/Stoich)	Power Enrichment mode is active at higher RPMs and when the throttle position is greater than 95 percent. The purpose of PE mode is to operate the engine at maximum torque AFR and spark values for a short time, then adjust to more conservative values to reduce engine temperature. Available in pro user level only.
Warmup Enrichment (Lambda)	The warm up enrichment table adds additional fuel after start up. The fuel from this table decays out over time. The table is activated only once per key-on. If the engine stalls and is restarted without cycle in the ignition, enrichment continues from its value when the stall occurred.
Warmup Enrichment (Stoich)	The warm up enrichment table adds additional fuel after start up. The fuel from this table decays out over time, and it is only active for 20 to 30 seconds. The table is activated only once per key-on. If the engine stalls and is restarted without cycle in the ignition, enrichment continues from its value when the stall occurred.
Acceleration Enrichment Multiplier	This will determine the total amount of fuel to add during rapid changes in acceleration. To "globally" increase the amount of fuel added during acceleration enrichment increase this vale. To reduce the amount of fuel delivered decrease this value. Available in pro user level only.
Deceleration Enrichment Multiplier	This will determine the total amount of fuel to add or reduce during rapid changes in acceleration. To "globally" increase the amount of fuel added during deceleration enrichment decrease this vale. To reduce the amount of fuel delivered increase this value. Available in pro user level only.
MPG Adjustment	This adjusts the MPG readout for the bike. Higher values show a higher MPG, lower values show lower MPG.
Injector Gas Constant	This is a constant used internally for fuel injector calculations. It is not advised to change this value.

Closed Loop

tune item	description
Closed Loop Bias Front	The closed loop bias table is used to adjust the closed loop AFR. Setting the value in this table to 450 mV will result in a closed loop AFR of 14.68; increasing the value will give a richer mixture and decreasing the value will give a leaner mixture. Available in pro user level only.
Closed Loop Bias Rear	The closed loop bias table is used to adjust the closed loop AFR. Setting the value in this table to 450 mV will result in a closed loop AFR of 14.68; increasing the value will give a richer mixture and decreasing the value will give a leaner mixture. Available in pro user level only.
Closed Loop Bias	This is the amount that the O2 sensors will control to above or below Stoich (14.68 A/F ration for gasoline). Setting the value in this table to 450 mV will result in a closed loop AFR of 14.68; increasing the value will give a richer mixture and decreasing the value will give a leaner mixture.
Closed Loop Lambda Range	This is the Min and Max range of Lambda the ECM uses when operating in closed loop. A value above 1.01 will allow the ECM to learn a leaner rage for closed loop. A value lower than .98 will allow the ECM to operate at a richer range for closed loop.

Gear

tune item	description
Speedometer Calibration	This is the ratio the bike has in it from the factory. This must be changed to the new ratio when changing tire size. This value is Pulses Per 1/125th KM.
Gear Ratios	This represents the gear ratios of the transmission.

Limits and Switches

tune item	description
RPM Limit	Set these values to the RPM at which the rev limiter will engage. 6200 RPM is common for most 96ci to 103ci combinations; 10250 RPM for VROD.
EITMS	This tells the ECM if the vehicle has a Engine Idle Temperature Management System. A value of zero means this vehicle does not have this feature, or shuts off the input to the ECM. Available in pro user level only.
Knock Control	This tells the ECM if the vehicle has Knock Control. A value of zero means this vehicle does not have this feature, or shuts off the knock control to the ECM. A value of one means this vehicle does have this feature and the ECM will attempt to control knock.
Adaptive Control	This switch enables or disables Adaptive control. When in closed-loop the ECM will adapt to engine and environmental changes to maintain a consistent AFR. This works by the ECM first using the VE table to calculate how much fuel to deliver to hit the targeted AFR value. It then uses the O2 sensors to determine what the AFR actually is. If there is a difference, the ECM makes an adjustment and stores the difference in the adaptive fuel table. The Adaptive Fuel table will develop a correction profile that is applied to the fuel calculation for each load region. These values are saved in the ECM's memory and will be reloaded each time the bike is started. A value of zero (0) disables adaptive control. A value of one (1) enables adaptive control.
PE Enable RPM	Power Enrichment Mode will be activated at RPMs greater than this setting. To disable PE, set this value to your RPM limit or greater than your RPM limit.
Active Exhaust	This tells the ECM if the vehicle has active exhaust control. A value of zero means this vehicle does not have this feature, or shuts off the input to the ECM. Available in pro user level only.
Active Intake	This tells the ECM if the vehicle has active intake. A value of zero means this vehicle does not have this feature, or shuts off the input to the ECM. Available in pro user level only.
Active Compression Release	This tells the ECM if the vehicle has active compression release. A value of zero means this vehicle does not have this feature, or shuts off the input to the ECM. Available in pro user level only.
Heated O2 Sensors	This tells the ECM if the vehicle has heated O2 sensors. A value of zero means this vehicle does not have this feature, or shuts off the input to the ECM. Available in pro user level only.
PE Enable TPS	Power Enrichment Mode will be activated if TPS is greater than this setting. Available in pro user level only.

tune item	description
PE Disable TPS	Power Enrichment Mode will be disabled if TPS is less than this setting. Available in pro user level only.
PE Disable RPM	Power Enrichment Mode will be disabled at RPMs less than this setting. Available in pro user level only.
Closed Loop	For closed-Loop capable calibration, set this to off to disable closed-loop control.

Spark

tune item	description
PE Spark	Power Enrichment mode is active at higher RPMs and when the throttle position is greater than 95 percent. This table is desired spark over time. The purpose of PE mode is to operate the engine at maximum torque AFR and spark values for a short time, then adjust to more conservative values to reduce engine temperature. Available in pro user level only.
Spark Advance (Front)	There are two spark tables, one for each cylinder. This is because the rear cylinder runs hotter than the front and therefore has different timing requirements. The X-axis is KPA the Y-Axis is RPM. Set these values to the spark advance you would like the bike to operate at. Available in pro user level only.
Spark Advance (Rear)	There are two spark tables, one for each cylinder. This is because the rear cylinder runs hotter than the front and therefore has different timing requirements. The X-axis is KPA the Y-Axis is RPM. Set these values to the spark advance you would like the bike to operate at. Available in pro user level only.
Max Knock Retard	This is the maximum amount of knock retard the ECM will allow. Available in pro user level only.
Adaptive Knock Retard	The Delphi ECM utilizes Adaptive Spark Control based on information received from the knock detection system. This system learns retard values to apply when knock is detected. At each key-on the remembered values will be reduced towards zero. This gradually clears out the learned knock value to adapt changes in conditions. Available in pro user level only.
Closed Throttle Spark (Front)	This is the spark to run when the throttle is closed. This table can be modified to allow the engine to run at different spark values when the throttle is closed. This table will replace the spark advance table and any temperature corrections when the throttle is closed.

tune item	description
Closed Throttle Spark (Rear)	This is the spark to run when the throttle is closed. This table can be modified to allow the engine to run at different spark values when the throttle is closed. This table will replace the spark advance table and any temperature corrections when the throttle is closed.
Spark Adjust By Air Temp	Spark gets adjusted by this value to compensate for air temperature.
Spark Adjust By Engine Temp	Spark gets adjusted by this value to compensate for engine temperature.
Spark Adjust By Head Temp	Spark gets adjusted by this value to compensate for head temperature.

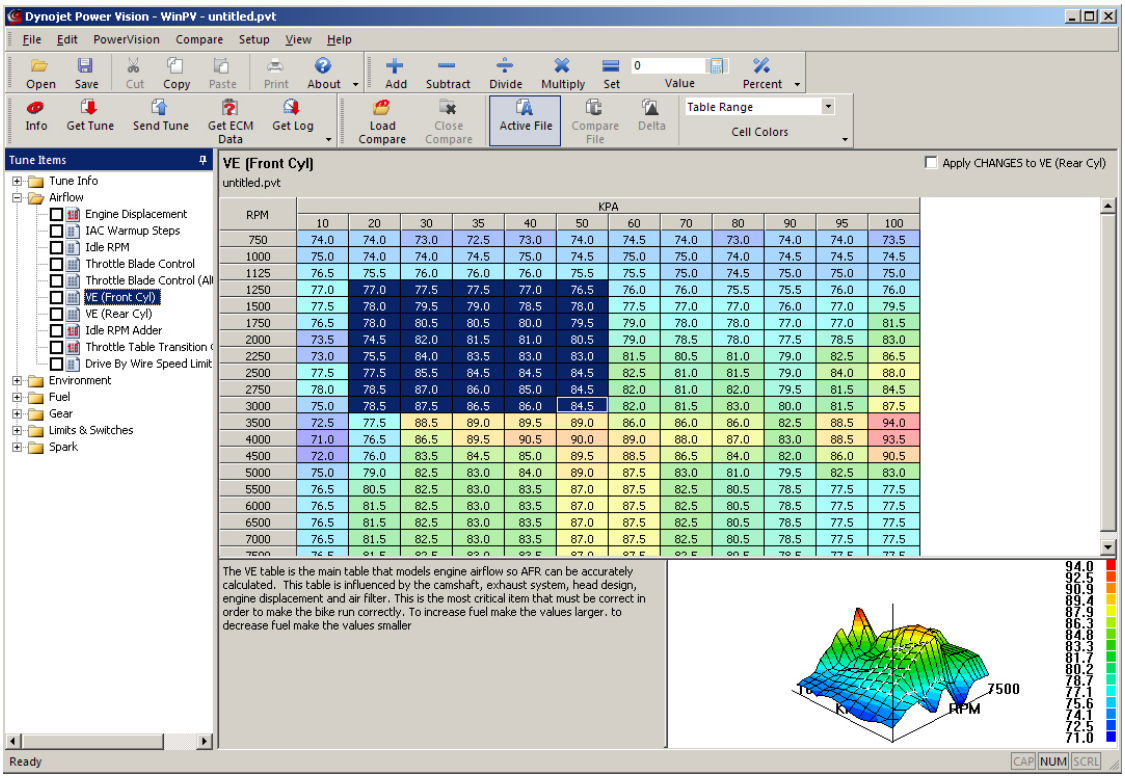
Table

The Table displays the item chosen in Tune Items.

The table is also displayed as a 3-D representation below the table.

1. Click one cell to select it.
2. Click and hold the mouse button while dragging to select multiple cells.

   Selected cells will appear with cross-hairs in the graphical display in the 3-D representation below the table.
3. Select a cell or group of cells, copy those values, and paste those values in different cell(s). For more information about changing cell values, refer to To View the Cell Math Toolbar.
4. You may also select a cell or group of cells and type values into those cells. For more information about changing cell values, refer to To View the Cell Math Toolbar.


Dynojet Power Vision - WinPV - untitled.pvt
File Edit PowerVision Compare Setup View Help
Open Save Cut Copy Paste Print About Add Subtract Divide Multiply Set Value Percent
Info Get Tune Send Tune Get ECM Data Get Log Load Compare Close Compare Active File Compare File Delta Table Range Cell Colors
Tune Items
Tune Info
Airflow
Engine Displacement
IAC Warmup Steps
Idle RPM
Throttle Blade Control
Throttle Blade Control (All
VE (Front Cyl)
VE (Rear Cyl)
Idle RPM Adder
Throttle Table Transition
Drive By Wire Speed Limit
Environment
Fuel
Gear
Limits & Switches
Spark
VE (Front Cyl)
untitled.pvt
Apply CHANGES to VE (Rear Cyl)
RPM
KPA
10 20 30 35 40 50 60 70 80 90 95 100
750 74.0 74.0 73.0 72.5 73.0 74.0 74.5 74.0 73.0 74.0 74.0 73.5
1000 75.0 74.0 74.0 74.5 75.0 74.5 75.0 75.0 74.0 74.5 74.5 74.5
1125 76.5 75.5 76.0 76.0 76.0 75.5 75.5 75.0 74.5 75.0 75.0 75.0
1250 77.0 77.0 77.5 77.5 77.0 76.5 76.0 76.0 75.5 75.5 76.0 76.0
1500 77.5 78.0 79.5 79.0 78.5 78.0 77.5 77.0 77.0 76.0 77.0 79.5
1750 76.5 78.0 80.5 80.5 80.0 79.5 79.0 78.0 78.0 77.0 77.0 81.5
2000 73.5 74.5 82.0 81.5 81.0 80.5 79.0 78.5 78.0 77.5 78.5 83.0
2250 73.0 75.5 84.0 83.5 83.0 83.0 81.5 80.5 81.0 79.0 82.5 86.5
2500 77.5 77.5 85.5 84.5 84.5 84.5 82.5 81.0 81.5 79.0 84.0 88.0
2750 78.0 78.5 87.0 86.0 85.0 84.5 82.0 81.0 82.0 79.5 81.5 84.5
3000 75.0 78.5 87.5 86.5 86.0 84.5 82.0 81.5 83.0 80.0 81.5 87.5
3500 72.5 77.5 88.5 89.0 89.5 89.0 86.0 86.0 86.0 82.5 88.5 94.0
4000 71.0 76.5 86.5 89.5 90.5 90.0 89.0 88.0 87.0 83.0 88.5 93.5
4500 72.0 76.0 83.5 84.5 85.0 89.5 88.5 86.5 84.0 82.0 86.0 90.5
5000 75.0 79.0 82.5 83.0 84.0 89.0 87.5 83.0 81.0 79.5 82.5 83.0
5500 76.5 80.5 82.5 83.0 83.5 87.0 87.5 82.5 80.5 78.5 77.5 77.5
6000 76.5 81.5 82.5 83.0 83.5 87.0 87.5 82.5 80.5 78.5 77.5 77.5
6500 76.5 81.5 82.5 83.0 83.5 87.0 87.5 82.5 80.5 78.5 77.5 77.5
7000 76.5 81.5 82.5 83.0 83.5 87.0 87.5 82.5 80.5 78.5 77.5 77.5
The VE table is the main table that models engine airflow so AFR can be accurately calculated. This table is influenced by the camshaft, exhaust system, head design, engine displacement and air filter. This is the most critical item that must be correct in order to make the bike run correctly. To increase fuel make the values larger. to decrease fuel make the values smaller
7500
RPM
94.0 92.5 90.9 89.4 87.9 86.3 84.8 83.3 81.7 80.2 78.7 77.1 75.6 74.1 72.5 71.0
Ready
CAP NUM SCRL

Status Bar

The Status Bar shows the status of the connected device.

CHAPTER 4

WORKING WITH POWER VISION

The Power Vision incorporates a very sophisticated, yet simple touch screen display that does not require the use of a computer to flash your bike. Simply select the tune and follow the on-screen prompts to download the tune, and if you'd like, edit your tune without ever touching a computer! Anyone of the three types of tunes outlined below is able to be edited on the device, or in the WinPV Tuning Application. Power Vision downloads and stores the stock calibration, allows you to select up to five different tunes that are stored on the device, and can be flashed to your bike. The types of tunes include:

Dynojet Pre-configured Tunes—Tunes for YOUR bike pre-loaded on the device…….ready to go, right out of the box! Power Vision identifies your bike's information and automatically sorts hundreds of applicable dyno proven tunes for you to choose from.

Custom Tunes—loaded by a custom tuning shop, or received via email and loaded on the device.

Copy of Stock—a version of the stock calibration that is editable.

Power Vision provides insightful, valuable information on how your bike is running.

- Display all J1850 H-D vehicle data, H-D CAN vehicle data, as well as wideband AFR and various calculated channels (such as MPG instant and trip MPG).
- Customizable virtual gauges allow data to be monitored live, and/or logged while riding.
- User defined visual alarms for any data channel (example, if knock exceeds two degrees, or if Cylinder Head Temp exceeds 280°F, enable visual alarm).
- AutoTune Basic and Pro—calculates and stores fuel trims to optimize fuel curve.
- Check and clear diagnostic codes.
- Reset adaptive fuel trims and idle offset.

Power Vision Menus

Program Vehicle Menu

To Load a Dynojet Pre-Configured Tune File
To Load a Custom Tune File
To Load a Copy of Original Tune File
To Load a Copy of Current Tune File
To Edit a Tune File
To Check the ECM Status
To Enable AutoTune
To Start an AutoTune Session
To Export a Learned Tune
To Load a Custom Tune File
To Edit AutoTune Settings
To Configure Quick Tune

Datalog Menu

To View Gauges

To Create Gauge Limits and Visual Warnings

To Playback a Log

To View Signals

To Reset Trip/Economy A

To Reset Trip/Economy B

To Create a Log with Power Vision

To Return to the Power Vision Main Menu

Vehicle Tools Menu

To View Vehicle Info

To View Stored DTC's

To Reset Trims

To Read ECM

To Restore Original Tune

To Return to the Power Vision Main Menu

Settings Menu

To Select the Units

To Change the Brightness

To Enter a Code

To Calibrate the Touch Screen

To Flip the Power Vision Screen

To Return to the Power Vision Main Menu

Device Info Menu

To View Information About the Power Vision

Dealer Info Menu

To View Information About the Dealer

Program Vehicle Menu

The Power Vision accepts custom tune files created in WinPV and pre-loaded Dynojet tunes installed in the Power Vision memory from Dynojet Research. To flash or edit tune files, the Power Vision must be married to the ECM. Marrying the Power Vision to the ECM locks the Power Vision module to that ECM and prevents a single device from being used on multiple ECMs. You cannot unlock a Power Vision from a married ECM. Once the marriage process is complete, you can open the stored calibration in the WinPV software to edit all parameters or change Dynojet specific functions on the device.

To Load a Dynojet Pre-Configured Tune File

Use the following steps to load a Dynojet pre-configured tune file to the ECM.

1. Turn the ignition key to the On position.
2. Verify the Run/Off switch is in the Run position.
3. Touch **Program Vehicle >Load Tune >Dynojet Pre-Configured Tunes**.

4 Touch a Dynojet tune file to load.

5 Touch **Select** to continue with the selected Dynojet tune file.

Or

Touch **Cancel** to abort the process and return to the load tune screen.

6 Verify the Tune information. If the Tune information is correct, touch **Continue**.

7 Touch a slot to save the selected tune file.
Note: If there is any data in the selected slot, it will be overwritten.

8 Touch **Select** to continue with the selected slot.

Or

Touch **Cancel** to abort the process and return to the tune manager.

9 Touch **OK** to continue.

A copy of the Dynojet tune will be saved.

Or

Touch **Cancel** to abort the process and return to the tune manager.

The tune is now ready.

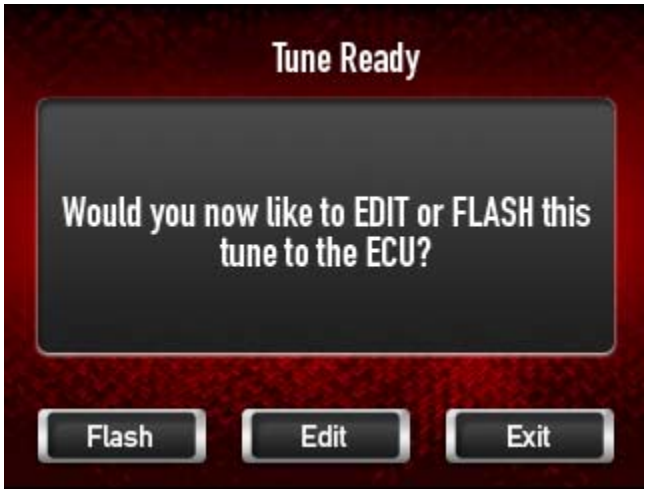
10 Touch **Flash** to send the file to the ECM.

Or

Touch **Edit** to edit the tune file on the Power Vision.

Or

Touch **Exit** to exit the screen without any changes.



11 Touch **OK**.

12 Turn the ignition key off and wait ten seconds.

To Load a Custom Tune File

The Power Vision accepts custom tune files created in the WinPV software or by Dynojet dealers.

Use the following steps to load a custom tune file to the ECM.

1. Turn the ignition key to the On position.
2. Verify the Run/Off switch is in the Run position.
3. Touch **Program Vehicle >Load Tune >Custom Tunes**.
4. Touch a Custom tune file to load.
5. Touch **Select** to continue with the selected Custom tune file.

   Or

   Touch **Cancel** to abort the process and return to the tune file screen.
6. Touch a slot to save the selected tune file.

   Note: If there is any data in the selected slot, it will be overwritten.
7. Touch **Select** to continue with the selected slot.

   Or

   Touch **Cancel** to abort the process and return to the tune manager.
8. Touch **OK** to continue.

   Or

   Touch **Cancel** to abort the process and return to the tune manager.

   The tune is now ready.
9. Touch **Flash** to send the file to the ECM.

   Or

   Touch **Edit** to edit the tune file on the Power Vision.

   Or

   Touch **Exit** to exit the screen without any changes.
10. Touch **OK**.
11. Turn the ignition key off and wait ten seconds.
12. Turn the ignition key back on.

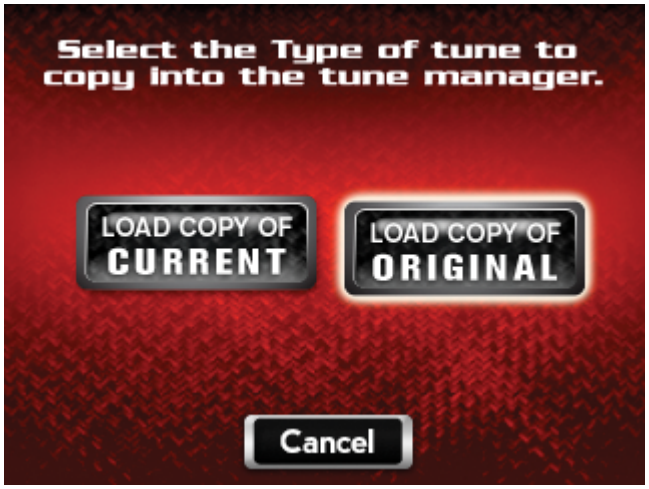
To Load a Copy of Original Tune File

Use the following steps to load a copy of the original tune file to the Power Vision. The original tune file is the tune that was saved when the Power Vision married to the ECM.

1. Turn the ignition key to the On position.
2. Verify the Run/Off switch is in the Run position.
3. Touch **Program Vehicle >Load Tune >Load Copy**.

4. Touch **Load Copy of Original**.

   This will load a copy of the original tune into the Tune Manager. Once loaded into a slot, it will be converted into a custom tune which can be edited and/or flashed to the ECM.



5 Touch **OK**.

The Power Vision and the bike are now married.

6 Touch **OK**.

7 Touch a slot to save the selected tune file.

Note: If there is any data in the selected slot, it will be overwritten.

8 Touch **Select** to continue with the selected slot.

Or

Touch **Cancel** to abort the process and return to the tune manager.

9 Touch **OK**.

A copy of the stock tune will be saved.

10 Touch **OK** to continue.

Or

Touch **Cancel** to abort the process and return to the tune manager.

The tune is now ready.

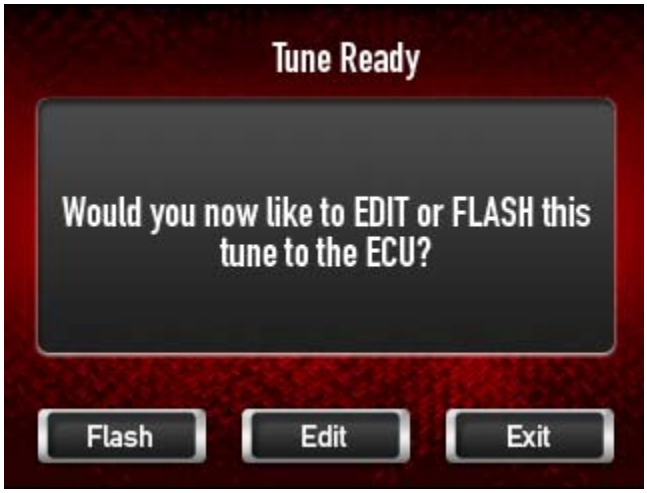
11 Touch **Flash** to send the file to the ECM.

Or

Touch **Edit** to edit the tune file on the Power Vision.

Or

Touch **Exit** to exit the screen without any changes.



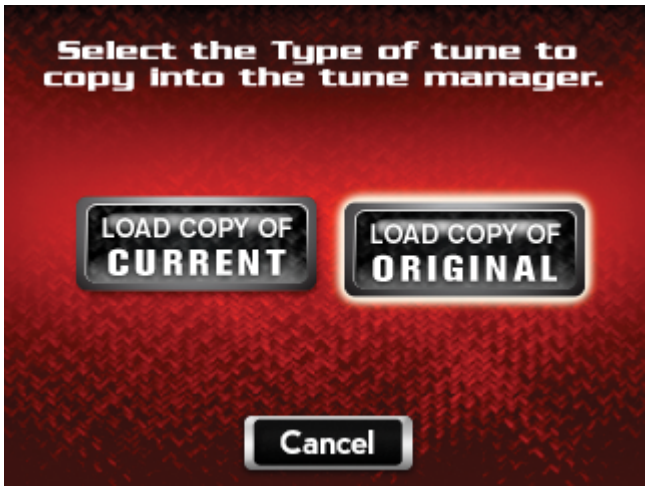
To Load a Copy of Current Tune File

Use the following steps to load a copy of the current tune file to the Power Vision. The current tune file is the tune that is currently in the ECM.

1. Turn the ignition key to the On position.
2. Verify the Run/Off switch is in the Run position.
3. Touch **Program Vehicle >Load Tune >Load Copy**.

4. Touch **Load Copy of Current**.

   This will load a copy of the current tune into the Tune Manager. Once loaded into a slot, it will be converted into a custom tune which can be edited and/or flashed to the ECM.



5 Touch **OK**.

The Power Vision and the bike are now married.

6 Touch **OK**.

7 Touch a slot to save the selected tune file.

Note: If there is any data in the selected slot, it will be overwritten.

8 Touch **Select** to continue with the selected slot.

Or

Touch **Cancel** to abort the process and return to the tune manager.

9 Touch **OK**.

A copy of the current tune will be saved.

10 Touch **OK** to continue.

Or

Touch **Cancel** to abort the process and return to the tune manager.

The tune is now ready.

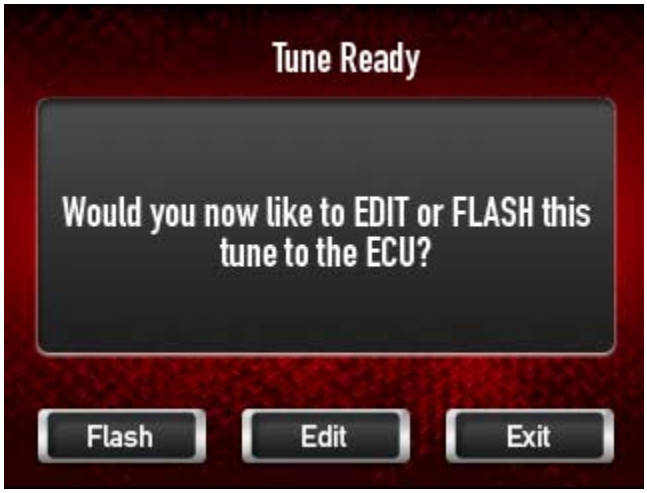
11 Touch **Flash** to send the file to the ECM.

Or

Touch **Edit** to edit the tune file on the Power Vision.

Or

Touch **Exit** to exit the screen without any changes.



To Edit a Tune File

Edit Tune allows you to edit Dynojet Tune, Custom Tune, or Copy of Stock Tune files directly on the Power Vision.

Use the following steps to edit a tune on the Power Vision.

1. Turn the ignition key to the On position.
2. Verify the Run/Off switch is in the Run position.
3. Touch **Program Vehicle >Edit Tune**.
4. Touch a tune slot to edit.
5. Touch **Select** to use the selected slot.

   Or

   Touch **Cancel** to abort the process and return to the tune manager.
6. Touch parameters to edit.
7. Touch **Select** to edit a parameter.

   Or

   Touch **Cancel** to abort the process and return to the tune manager.
8. Enter a new value in field.
9. Touch **Save** to save the new value.

   Or

   Touch **Cancel** to abort the process and return to the tune manager.
10. Touch **Yes** to confirm the change.

    Or

    Touch **No** to cancel the change.
11. Touch **Yes** to save the changes.

    Or

    Touch **No** to cancel the change.
12. Touch **OK** to complete the procedure.

    Note: For changes to be applied you must flash the edited tune file to the ECM.

To Check the ECM Status

Status allows you to verify the connection status between the Power Vision and the ECM.

Use the following steps to check the status.

1. Touch **Program Vehicle >Status**.
2. Touch **Back** to return to the Power Vision main menu.

To Enable AutoTune

For more information about AutoTune, refer to Understanding AutoTune.

Use the following steps to enable AutoTune.

1 Touch **Program Vehicle >AutoTune.**

Note: Verify the Setting for AutoTune is correct for your model of motorcycle. Refer to To Edit AutoTune Settings.

2 Touch **Enable AT**.

3 Touch a tune file to load.

4 Touch **Select** to continue with the selected tune file.

Or

Touch **Cancel** to abort the process and return to the program vehicle menu.

PowerVision Application
Step 1:Select TUNE to Autotune
Slot 1 - My176AE-LogTuned-Smoo
Slot 2 - Autotune Results 0005.0
Slot 3 - Autotune Results 0005.1
Slot 4 - Autotune Results 0003.4
Slot 5 - Autotune Results 0002.0
Slot 6 - Autotune Results 0002.1
Select
Cancel

5 Select the AutoTune mode.

Touch **Basic** to use the OEM Narrowband O2 sensor, tuning to a temporary stoich (14.6) Air Fuel Ratio.

Or

Touch **Pro** to use Dynojet Widebands for tuning using a wider Air Fuel Ratio range.

Note: If you do not have Wideband O2 sensors installed (ie. those included in the Dynojet AutoTune kit) select Basic.

The two different methods of AutoTune yield similar results in most areas, but Dynojet recommends using AutoTune Pro for best results in all operating conditions that you would experience while riding.

Or

Touch **Cancel** to abort the process and return to the tune manager.

PowerVision Application
Step 2:Which Autotune mode?
Select installed O2 Sensor Style.
'Basic' uses the OEM Narrowband O2 sensors, tuning to temporary stoich (14.6) Air-Fuel ratio.
'Pro' uses Dynojet Widebands for tuning, using a wider Air Fuel Ratio range.
Cancel
Basic
Pro

6 Touch **Continue** to send the file to the ECM or touch **Cancel** to exit the screen without any changes.

The tune is modified to be compatible with the mode you chose from above.

Note: The Power Vision must be connected to the vehicle with the key and run switch in the on position with the engine not running.

WARNING!Do not turn off the ignition or interrupt the power during this process. This can cause irreversible damage to the ECM.

PowerVision Application
Step 3:Flash ECM
This will modify the tune for Autotune and load it onto the Vehicle. The vehicle must be connected to the PV for this step.
Continue
Cancel

7 Once the process is complete, you will be prompted to turn the key off and wait ten seconds. Touch **OK**.

8 Turn the ignition key off and wait ten seconds.

9 Turn the ignition key back on.

AutoTune is set up.

To Start an AutoTune Session

You can define when AutoTune is active by adjusting various settings. For more information, refer to To Edit AutoTune Settings. For more information about AutoTune, refer to Understanding AutoTune.

The values learned during the AutoTune process will automatically save:

- Every five minutes
- When the vehicle comes to a stop during a drive cycle

The values learned during the AutoTune process will also save when you:

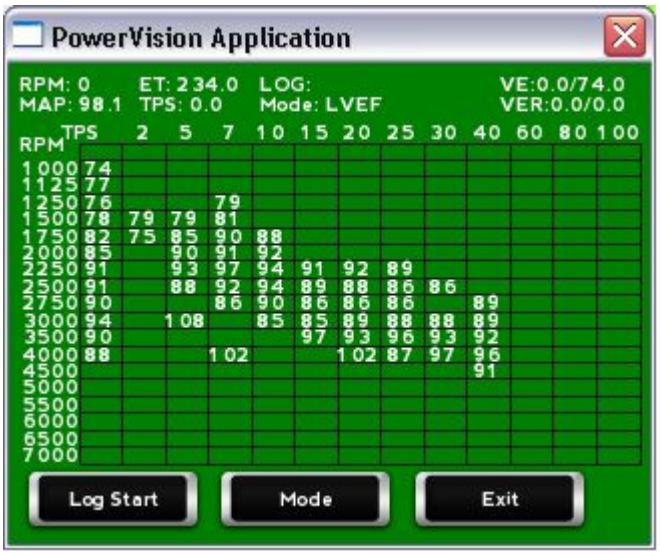
- Press the mode button
- Turn datalogging on or off
- Exit the green screen
- Disable AutoTune

Use the following process to start an AutoTune session.

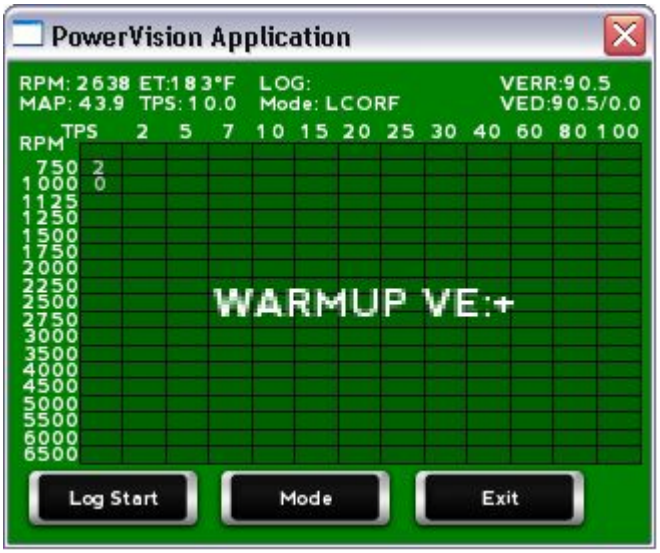
Touch **Program Vehicle >AutoTune >Datalog**.

AutoTune is now active and will start learning anytime you are in the AutoTune Datalogger screen (shown below). The AutoTune Datalogger screen indicates the learning process is active and you're on your way to perfecting your tune.

Note: You have the option to create a log file by touching **Log Start** to log channels required for Log Tuner. You do not need to select Log Start in order to start the AutoTune process.



AutoTune Datalogger monitors various operating conditions to ensure you're ready to start auto tuning and whether or not you're in a state to allow learning. A large message will overlay the screen to indicate the condition that's currently preventing learning. Refer to AutoTune Datalogger Operating Conditions for a list of conditions.



AutoTune Datalogger Operating Conditions

The following table lists the various AutoTune Datalogger operating conditions and a description of each condition.

condition	description
No Connection	The ECM is not responding.
ET:!	The engine temperature is not reading.
ET:L	The engine temperature is too low.
ET:H	The engine temperature is too high.
WARMUP:	The ECM is still using warm up tables.
AE:	The ECM is using acceleration enrichment tables.
RPM:!	The engine speed is not reading.
RPM:L	The engine speed is too low.
RPM:H	The engine speed is too high.
WBF:!	The Wideband O2 sensor (front) is not ready.
WBF:L	The Wideband O2 sensor (front) too low (less than lambda 0.68). This is usually during warm up.
WBF:H	The Wideband O2 sensor (front) too high (over lambda 1.22). This is usually during heavy deceleration.
WBR:!	The Wideband O2 sensor (rear) is not ready.
WBR:L	The Wideband O2 sensor (rear) too low (less than lambda 0.68). This is usually during warm up.
WBR:H	The Wideband O2 sensor (rear) too high (over lambda 1.22). This is usually during heavy deceleration.
NBF:!	The OEM narrowband sensor (front) is not ready.
NBF:O	The OEM narrowband sensor (front) in open loop.
NBR:!	The OEM narrowband sensor (rear) is not ready.
NBR:O	The OEM narrowband sensor (rear) in open loop.
VE:!	Unable to match current conditions to a VE table cell.
VE:+	The conditions are changing too rapidly or moving between VE table cells.
MAP:L	The map sensor is reading too low (usually deceleration). Map <20 KPA.

AutoTune Datalogger Modes

The following table lists the various AutoTune Datalogger modes and a description of each mode.

Note: Dynojet recommends viewing AutoTune Datalogger modes only while on a dyno.

mode	description
HITS	Shows the length of time spent in each VE cell. Shows the entire VE table at once.
VEFront	Shows the VE front table as stored in the tune.
VERear	Shows the VE rear table as stored in the tune.
LVE-F	Learned VE front.
LVE-R	Learned VE rear.
LCOR-F	Learned correction to VE front (in percent).
LCOR-R	Learned correction to VE rear (in percent).
RT	Real Time is the same as HITS but zooms in and slides the VE table around as you drive allowing you to target in on cells better.

To Export a Learned Tune

Version 1.0.15-1184 of the Power Vision analyzes the learned values ensuring you do not exceed the maximum allowed value for any cell in the VE tables (127.5). For more information about AutoTune, refer to Understanding AutoTune.

Use the following steps to export learned data from the AutoTUne process to a new tune in the tune manager that can be flashed to the ECM.

1 From the AutoTune Session screen, touch **Export Learned.**

Note: Step #2 will only apply if your tuning session yields learned data that reaches the upper limit of the VE table.

2 Touch **Scale** to allow the Power Vision AutoTune feature to auto scale the necessary values in your tune to avoid reaching the maximum allowed VE values.

Or

Touch **Cap** to proceed with the export and understand that some of the required corrections could not be made to your tune.

Or

Touch **Exit** to exit the screen without any changes.

PowerVision Application
Export Tune
VE values over 125 were found. 127.5 is the absolute maximum allowed. Would you like to auto-scale the max VE value down to 120 and scale Displacement up to correct this? Select SCALE for auto-scaling, or select CAP to cap any values over 127.5.
Scale
Cap
Exit

3 Touch **Continue** to apply all learned values to the tune and save it to a Custom Tune slot.

PowerVision Application
Export Tune
This will apply all learned values to the tune and save it to a CUSTOM TUNE slot.
Continue
Cancel

4 Touch a slot to save the tune file.

Note: If there is any data in the selected slot, it will be overwritten.

5 Touch **Select** to continue with the selected slot.

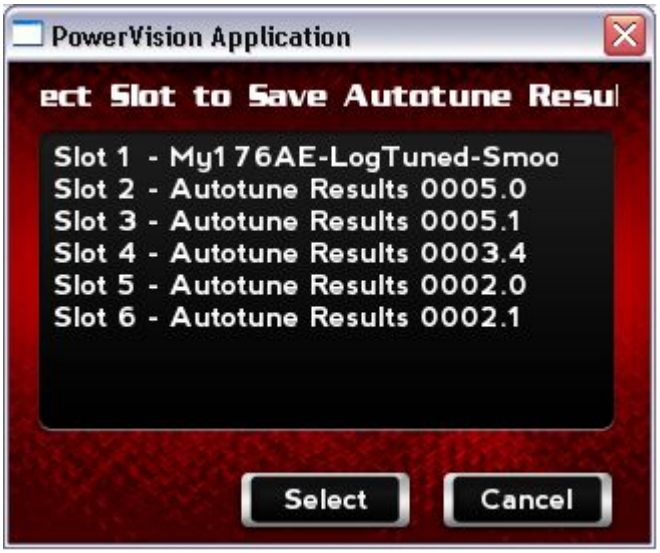
Or

Touch **Cancel** to abort the process.

6 Touch **OK** to continue.

A copy of the tune will be saved.

These are full tunes/calibrations, not just the values learned. This is a version of the tune you started with but the VE (and potentially spark tables) will be modified.


PowerVision Application
ect Slot to Save Autotune Resul
Slot 1 - My176AE-LogTuned-Smoo
Slot 2 - Autotune Results 0005.0
Slot 3 - Autotune Results 0005.1
Slot 4 - Autotune Results 0003.4
Slot 5 - Autotune Results 0002.0
Slot 6 - Autotune Results 0002.1
Select
Cancel

It is time to flash the ECM with the new tune you just saved to the tune manager. Once the new tune has been flashed to the ECM, you can ride the bike to feel the results or engage in another tuning session to continue to refine your custom tune. If you do not flash a tune to the ECM, you will still be running on a tune set up by the AutoTune feature.

7 Exit to the Main Menu and load your custom tune. Refer to To Load a Custom Tune File.

To Load a Custom Tune File

For more information about AutoTune, refer to Understanding AutoTune.

1 Turn the ignition key to the On position.
2 Verify the Run/Off switch is in the Run position. Do not start the engine.
3 Touch **Program Vehicle >Load Tune >Custom Tune**.

4 Touch the last tune you saved to the Tune Manager. This will be the tune that contains the AutoTune corrections.

Note:A tune saved in the Tune Manager will never have those values that are set up by the AutoTune process included within them, only the values that were learned during the AutoTune process.

5 Touch **Select** to continue with the selected tune file.

Or

Touch **Cancel** to abort the process and return to the custom tune screen.

PowerVision Application
Step 1:Select TUNE to Autotune
Slot 1 - My176AE-LogTuned-Smoo
Slot 2 - Autotune Results 0005.0
Slot 3 - Autotune Results 0005.1
Slot 4 - Autotune Results 0003.4
Slot 5 - Autotune Results 0002.0
Slot 6 - Autotune Results 0002.1
Select
Cancel

6 Touch **Flash** to send the file to the ECM.

Note: Do not turn off the key while the Power Vision is flashing the ECM. Once the process is complete, you will be prompted to turn the key off and wait ten seconds.

7 Touch **OK**.

8 Turn the ignition key off and wait ten seconds.

9 Turn the ignition key back on.

You can ride the bike with the changes from the AutoTune process or you can start a new tuning session to continue to refine your custom tune.

To Edit AutoTune Settings

For more information about AutoTune, refer to Understanding AutoTune.

Use the following steps to edit the AutoTune settings.

1 Touch **Program Vehicle >AutoTune >Settings.**
Note: Changing the settings while AutoTune is active will reset all learned values.

2 Touch **Continue**.
Note: Changing the settings while AutoTune is active will reset all learned values.

PowerVision Application
WARNING
Entering SETTINGS while Autotune is active will RESET ALL LEARNED VALUES when you press Continue.
Continue
Cancel

3 Touch a setting to edit. In this example we will use Max Spark Learn.
To see a list of all settings and descriptions, refer to AutoTune Settings.

4 Touch **Select** to continue with the selected setting.
Or
Touch **Exit** to abort the process.

PowerVision Application
Select Setting to EDIT
[-- Reset all to DEFAULTS --]
Min Hit Count (5 ticks)
Min VE Learn (0.01 Percent)
Max VE Learn (15.00 Percent)
Min Spark Learn (1.00 Degrees)
Max Spark Learn (0.00 Degrees)
Min WB Lambda (0.68 Lambda)
Max WB Lambda (1.22 Lambda)
Min Engine Temp (75.0 DegC)
Exit
Select

5 A description of the setting will appear. Touch **Continue** to edit the selected setting.
To see a list of all settings and descriptions, refer to AutoTune Settings.

PowerVision Application
Max Spark Learn
The maximum amount, in degrees, that a Spark cell is allowed to change. Set this to 0 to disable Spark learning. A good starting value would 10 degrees.
Continue

6 Using the number pad, enter the value for the setting.

The numeric display will show the current value. The default value is shown under the setting title.

In this example, 10 degrees was entered. This will enable spark tuning up to 10 degrees.

7 Touch **Save** to confirm the value or **Cancel** to return to the list of settings.

8 Touch **Yes** to confirm the changes.

Or

Touch **No** to abort the process.

The setting value is updated. In this example, Max Spark Learn is now 10 degrees.

9 Touch **Exit** to exit the Setting screen.

PowerVision Application
Select Setting to EDIT
[-- Reset all to DEFAULTS --]
Min Hit Count (5 ticks)
Min VE Learn (0.01 Percent)
Max VE Learn (15.00 Percent)
Min Spark Learn (1.00 Degrees)
Max Spark Learn (10.00 Degrees)
Min WB Lambda (0.68 Lambda)
Max WB Lambda (1.22 Lambda)
Min Engine Temp (75.0 DegC)
Exit
Select

If you need assistance on recommended values for different families of bikes, please email PVtech@dynojet.com.

AutoTune Settings

The following table lists the various AutoTune settings and a description of each setting.

setting	description
Min Hit Count (ticks)	The minimum number of hits on a cell for learning to take place.
Min VE Learn (Percent)	The minimum amount a VE cell needs to learn before a change will take place.
Max VE Learn (Percent)	The maximum amount a VE cell is allowed to change, in VE units. Set this to 0 to disable VE learning.
Min Spark Learn (Degrees)	The minimum amount a Spark cell needs to learn before a change will take place.
Max Spark Learn (Degrees)	The maximum amount, in degrees, that a Spark cell is allowed to change. Set this to 0 to disable Spark learning. A good starting value would 10 degrees.
Min WB Lambda (Lambda)	The richest value as measured on the Wideband in Pro Mode that is allowed. This is in Lambda.
Max WB Lambda (Lambda)	The leanest value as measured on the Wideband in Pro Mode where learning is allowed. This is in Lambda.

setting	description
Min Engine Temp (DegC)	The coldest engine temperature where learning is allowed, entered in Degrees Celsius or Fahrenheit (depends on Power Vision Unit Setting).
Max Engine Temp (DegC)	The maximum engine temperature where learning is allowed, entered in Degrees Celsius or Fahrenheit (depends on Power Vision Unit Setting).
Min RPM (RPM)	The minimum engine speed where learning is allowed, in RPM.
Max RPM (RPM)	The maximum engine speed where learning is allowed, in RPM.
Min MAP (KPA)	The minimum MAP value where learning is allowed. This is used to filter out deceleration events.
Max MAP (KPA)	The maximum MAP value where learning is allowed. This is usually marked as not used and set to something high, like 120 KPA.

Default AutoTune Settings

The following table lists the default AutoTune settings for different vehicles.

setting	Big Twin including Softail Dyna and Touring models	V-Rod models	Sportster models
Min Hit Count	5 ticks	5 ticks	5 ticks
Min VE Learn	0.01 percent	0.01 percent	0.01 percent
Max VE Learn	15.00 percent	15.00 percent	15.00 percent
Min Spark Learn	1.00 degrees	1.00 degrees	1.00 degrees
Max Spark Learn	0.00 degrees	0.00 degrees	0.00 degrees
Min WB Lambda	0.68 lambda	0.68 lambda	0.68 lambda
Max WB Lambda	1.22 lambda	1.22 lambda	1.22 lambda
Min Engine Temp	167°F	160°F	280°F
Max Engine Temp	300°F	230°F	410°F
Min RPM	900 RPM	1000 RPM	1000 RPM
Max RPM	6000 RPM	10000 RPM	7000 RPM
Min MAP	20 KPA	20 KPA	20 KPA
Max MAP	120 KPA	120 KPA	120 KPA

To Configure Quick Tune

Quick Tune allows you to alter the last tune flashed to the vehicle's ECM without requiring a computer and WinPV software.

Note: You must flash a tune to the ECM before using Quick Tune. Once a tune is flashed to the ECM, the tune is stored in a buffer allowing you to use the Quick Tune feature.

1 Touch **Program Vehicle >Quick Tune.**

2 Touch **General**.

Use the General tab to set the Idle Offset, Rev Limit, and Reset Adaptive Fuel Tables.

2a Using the up or down arrows, increase or decrease the Idle Offset.

Idle Offset changes the RPM at which the engine will idle. A positive number increases the idle and a negative number decreases the idle.

2b Using the up or down arrows, increase or decrease the Rev Limit.

Rev Limit changes the RPM at which the rev limiter engages. A positive number increases the rev limit and a negative number decreases the rev limit.

2c Click the box to reset the Adaptive Fuel Tables.

Resetting the Adaptive Fuel Tables clears the corrections the ECM has made based on readings from the factory narrow band O2 sensors.

3 Touch **Config**.

Use the Config tab to set the ACR (Auto Compression Release), Heated O2, VSS, Active Intake, and Active Exhaust.

3a Click the box to enable/disable ACR (Auto Compression Release).

3b Click the box to enable/disable Active Intake.

3c Click the box to enable/disable the oxygen sensor heater.

3d Click the box to enable/disable Active Exhaust.

3e Using the up or down arrows, increase or decrease the Vehicle Speed Sensor (VSS) calibration.

This is used to calibrate the speedometer.

4 Touch **Tweaks**.

Use the Tweaks tab to set Adaptive, Closed Loop, AutoTune Mode, Knock Control, and EITMS (Engine Idle Temperature Management System).

4a Click the box to enable/disable Adaptive.

4b Click the box to enable/disable Knock Control.

4c Click the box to enable/disable Closed Loop.

4d Click the box to enable/disable EITMS (Engine Idle Temperature Management System).

4e Using the up or down arrows, select the AutoTune Mode.

5 Touch **Fuel**.

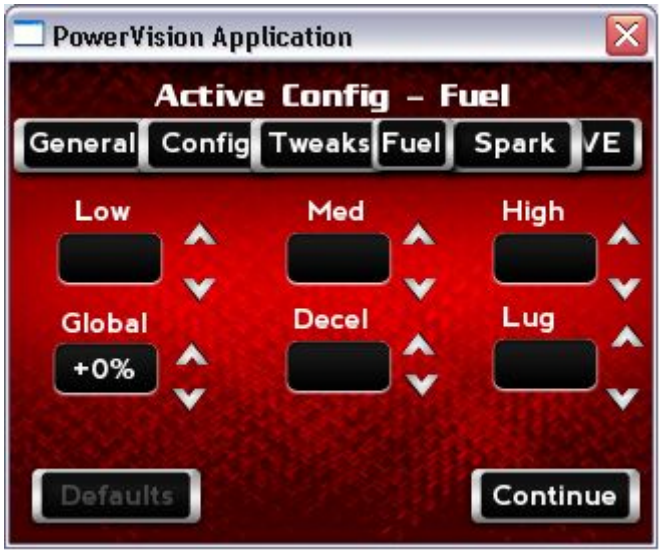
Use the Fuel tab to set the fuel adjustment. The fuel adjustment range is -25 to 25% offset of the base fuel map.

5a Using the up or down arrows, set any of the six ranges of fuel adjustment. Refer to the Fuel, Spark, and VE Ranges Table.

6 Touch **Spark**.

Use the Spark tab to set the spark adjustment. The spark adjustment range is -5 to 5 degrees from the base timing advance map.

6a Using the up or down arrows, set any of the six ranges of spark adjustment. Refer to the Fuel, Spark, and VE Ranges Table.



7 Touch **VE**.

Use the VE (Volumetric Efficiency) tab to set the VE adjustment. The VE adjustment range is -25 to 25 VE units offset from the base VE table.

7a Using the up or down arrows, set any of the six ranges of VE adjustment. Refer to the Fuel, Spark, and VE Ranges Table.

8 Touch **Continue** to apply your changes.

Fuel, Spark, and VE Ranges Table

The following table is an example of where the fuel, spark, and VE ranges are.

Spark Advance (Front Cyl)
11-KGM-YN788NM.pvt

RPM	MAP (KPa)									
	15	20	30	40	50	60	70	80	90	100
750	0.00	2.00	2.00	2.00	2.00	10.00	10.00	10.00		
1000	0.00	2.00				10.00	10.00	10.00		
1125	0.00	2.00				8.00	8.00	8.00	10.00	10.00
1250	0.00	2.00				8.00	8.00	8.00	10.00	10.00
1500	0.00	2.00	2.00	2.00	2.00	8.00	8.00	8.00	15.00	15.00
1750	0.00	2.00	2.00	2.00	2.00	8.00	8.00	8.00	15.00	15.00
2000	0.00	2.00	2.00	2.00	2.00	8.00	8.00	8.00	15.00	15.00
2250	0.00	0.00	8.00	8.00	8.00	8.00	8.00	8.00	15.00	15.00
2500	0.00	0.00	8.00	8				8.00	15.00	15.00
2750	0.00	0.00	8.00	8				8.00	15.00	15.00
3000	0.00	0.00	8.00	8.00	8.00	8.00	8.00	8.00	15.00	15.00
3500	0.00	0.00	8.00	8.00	8.00	8.00	8.00	15.00	15.00	15.00
4000	0.00	0.00	8.00	8.00	8.00	8.00	8.00	15.00	15.00	15.00
4500	0.00	0.00	8.00	8.00	8.00	8.00	8.00	15.00	15.00	15.00
5000	0.00	0.00	8.00	8.00	8.00	15.00	15.00	15.00	15.00	15.00
5500	0.00	0.00	0.00	0.00	0.00	15.00	15.00	15.00	15.00	15.00
6000	0.0		00	0.00	0.00	15.00				.00
6500	0.0		00	0.00	0.00	15.00				.00
7000	0.00	0.00	0.00	0.00	0.00	15.00				.00
7500	0.00	0.00	0.00	0.00	0.00	15.00	15.00	15.00	15.00	15.00
8000	0.00	0.00	0.00	0.00	0.00	15.00	15.00	15.00	15.00	15.00

Lugging
Low Loads
Med Loads
Decel
High Loads

Datalog Menu

To View Gauges

1. Touch **Datalog >Gauges**.
2. Using the left or right arrows at the bottom of the screen, select your desired gauge template.
3. Touch **None**, or the current gauge label, to edit the gauge properties.

4. Select **None**, or the current gauge label, (in the space located to the right of Signal).

5 From the device list, choose Harley or DJ Wideband2.
6 Touch **Select** to confirm your choice.

Or

Touch **Cancel** to return to the Set Gauge Properties screen.

7 From the Signal list, assign a signal.
8 Touch **OK** to confirm your selection.

Or

Touch **Cancel** to return to the Set Gauge Properties screen.

To edit additional gauge properties, refer to To Create Gauge Limits and Visual Warnings.

9 Touch **OK** to confirm the gauge properties.
10 Touch **Exit** to exit the Datalog menu.
11 Touch **Back** to return to the Power Vision main menu.

To Create Gauge Limits and Visual Warnings

1. Touch **Datalog >Gauges**.
2. Using the left or right arrows at the bottom of the screen, select your desired gauge template.
3. Touch **None**, or the current gauge label, to edit the gauge properties.

4. Touch **None**, or the current gauge label, (in the space located to the right of Signal).

5 From the device list, choose Harley or DJ Wideband2.

6 Touch **Select** to confirm your choice.

Or

Touch **Cancel** to return to the Set Gauge Properties screen.

7 From the Signal list, assign a signal.

8 Touch **OK** to confirm your selection.

Or

Touch **Cancel** to return to the Set Gauge Properties screen.

9 To set the minimum value for the signal:

9a Touch **L. Limit**.

9b Using the number pad, enter the minimum value for the signal.

9c Touch **Save** to confirm the value or **Cancel** to return to the Set Gauge Properties screen.

10 To set the maximum value for the signal:

10a Touch **H. Limit**.

10b Using the number pad, enter the maximum value for the signal.

10c Touch **Save** to confirm the value or **Cancel** to return to the Set Gauge Properties screen.

11 To set the low warning value for the signal:

11a Touch **L. Warning**.

11b Using the number pad, enter the low warning value for the signal.

11c Touch **Save** to confirm the value or **Cancel** to return to the Set Gauge Properties screen.

12 To set the high warning value for the signal:

12a Touch **H. Warning**.

12b Using the number pad, enter the high warning value for the signal.

12c Touch **Save** to confirm the value or **Cancel** to return to the Set Gauge Properties screen.

13 Touch **OK** to confirm your changes.

Or

Touch **Cancel** to return to the gauge screen.

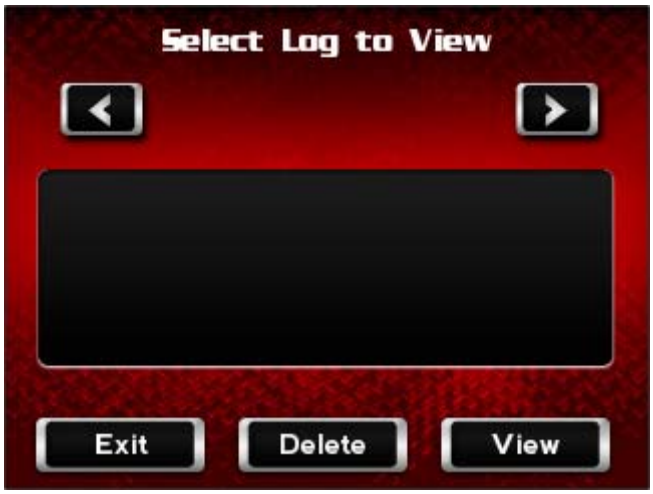
14 Touch **Exit** to exit the Datalog menu.

15 Touch **Back** to return to the Power Vision main menu.

To Playback a Log

Playback allows you to play back recorded log files saved on the Power Vision.

1. Touch **Datalog >Playback**.
2. Touch a log to view.
3. Touch **View** to view the log.
4. Touch **Delete** to delete the log.
5. Touch **Exit** to return to the Datalog menu.



To View Signals

Signals are channels that can be logged on the Power Vision. You can add, edit, or delete channels that are data logged.

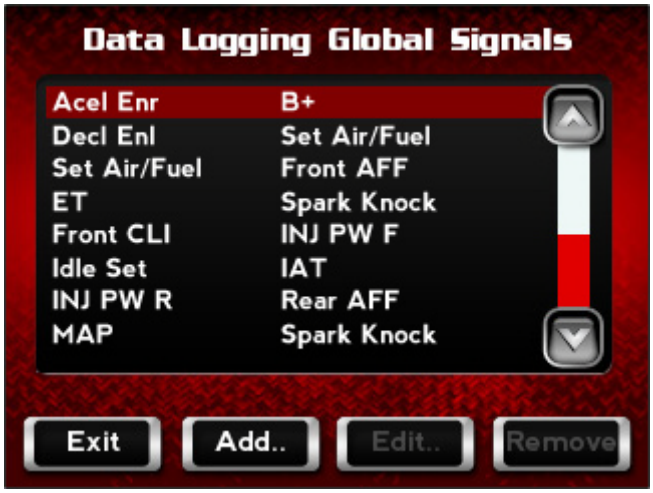
1 Touch **Datalog >Signals**.

2 To edit one of the channels from the list:

2a Select a channel from the list.

2b Touch **Edit** to change the gauge properties for the selected channel.

For more information about editing gauge properties, refer to To View Gauges and To Create Gauge Limits and Visual Warnings.



3 To remove a channel from the list:

3a Select a channel from the list.

3b Touch **Remove** to delete the channel from the data logging global signal list.

4 To add a channel to the current list:

4a Touch **Add** to add a channel not in the current list.

4b Use the Set Global Signal Properties screen to select and set up a channel.

For more information about creating a gauge channel, refer to To View Gauges.

4c Touch **OK** to return to the Data Logging Global Signals screen.

5 Touch **Exit** to return to the Datalog menu.

To Reset Trip/Economy A

Reset Trip/Economy A resets the tripometer and fuel economy meter in the Power Vision.

Touch **Datalog >Reset Trip/Eco A**.

To Reset Trip/Economy B

Reset Trip/Economy A resets the tripometer and fuel economy meter in the Power Vision.

Touch **Datalog >Reset Trip/Eco B**.

To Create a Log with Power Vision

The Dynojet Power Vision has internal logging capabilities when monitoring gauges.

1. Touch **Datalog >Gauges**.
2. Using the left or right arrows at the bottom of the screen, select gauge you would like to use.
3. Touch **Start Log** to begin logging.
4. Touch **End Log** to stop logging.
5. Touch **Exit** to return to the Datalog menu.

To Return to the Power Vision Main Menu

Touch **Back**.

Vehicle Tools Menu

To View Vehicle Info

Vehicle Info stores VIN data, ECM family information, model number, ECM part number, and other vehicle specific information.

1. Touch **Vehicle Tools >Vehicle Info**.
2. Touch **Exit** to return to the Vehicle Tools menu.

To View Stored DTC's

Stored DTC's displays and allows you to clear Dealer Trouble Codes. Stored DTC's can be used on multiple Delphi equipped Harley-Davidson Motorcycles, even after the Power Vision is married to one specific ECM.

1. Touch **Vehicle Tools >Stored DTC's**.
2. Touch **Read** to view stored DTC's.
3. Touch **Clear** to erase stored DTC's.
4. Touch **Exit** to return to the Vehicle Tools menu.

To Reset Trims

Reset Trims resets adaptive fuel or idle trims that have been learned by the ECM. Resetting these trims before a tune session is recommended.

1. Touch **Vehicle Tools >Reset Trims**.
2. Touch **Reset Fuel Trim** to reset the fuel trims.

   Or

   Touch **Reset Idle Trim** to reset the idle trims.

3. Touch **Read** to view the current information.
4. Touch **Exit** to return to the Reset Trims screen.

5. Touch **Back** to return to the Vehicle Tools menu.

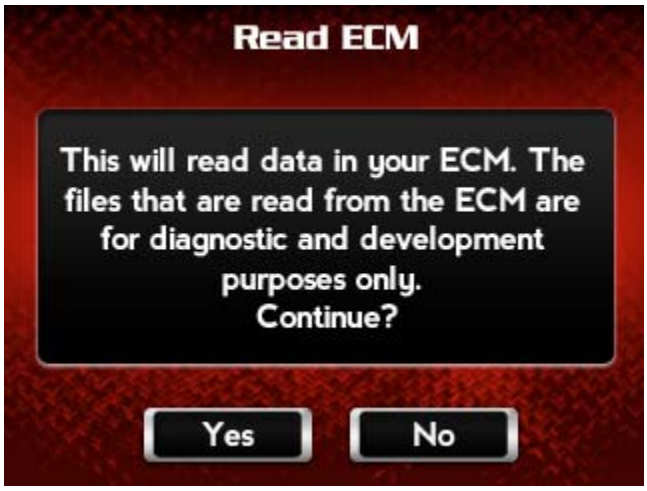
To Read ECM

Read ECM is for development purposes only and should only be selected when instructed by a Dynojet Technician.

1. Touch **Vehicle Tools >Read ECM**.
2. Touch **Yes** to continue.

   Or

   Touch **No** to return to the Vehicle Tools menu.


Read ECM
This will read data in your ECM. The files that are read from the ECM are for diagnostic and development purposes only.
Continue?
Yes
No

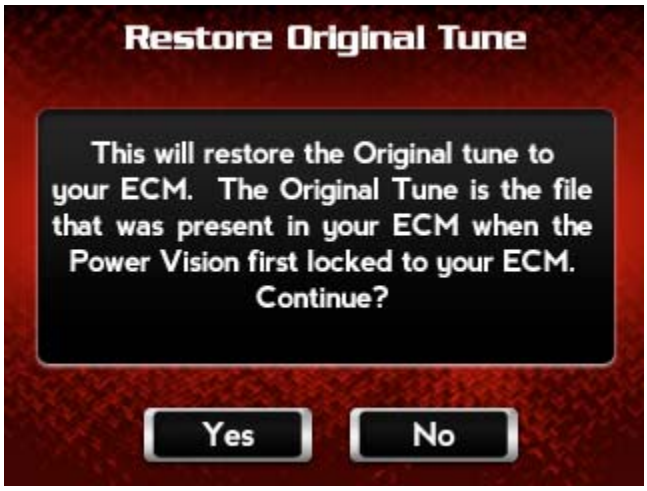
To Restore Original Tune

Restore Original Tune allows you to restore the factory ECM calibration.

1. Touch **Vehicle Tools >Restore Original Tune**.
2. Touch **Yes** to restore the original tune to your ECM.

   Or

   Touch **No** to return to the Vehicle Tools menu.


Restore Original Tune
This will restore the Original tune to your ECM. The Original Tune is the file that was present in your ECM when the Power Vision first locked to your ECM. Continue?
Yes
No

To Return to the Power Vision Main Menu

Touch **Back**.

Settings Menu

To Select the Units

Units sets all Power Vision units to either Metric or English.

1. Touch **Settings >Units**.
2. Touch **English** or **Metric**.
3. Touch **Back** to return to the Setting menu.

To Change the Brightness

1. Touch **Settings >Brightness**.
2. Use the arrows to increase or decrease the brightness of the Power Vision screen.
3. Touch **Save** to confirm the changes.

   Or

Touch **Cancel** to return to the Settings menu.

To Enter a Code

1. Touch **Settings >Enter Code**.
2. Using the number pad, enter a code.
3. Touch **Save** to save the code.

   Or

   Touch **Cancel** to return to the Settings menu.

To Calibrate the Touch Screen

Use the following steps to calibrate the Power Vision touch screen.

1. Touch **Settings >Touch Calibrate**.
2. Touch the plus (+) signs as they appear.

   The calibration process will complete once all points have been touched.

To Flip the Power Vision Screen

Flip Screen rotates the Power Vision screen orientation 180 degrees.

Touch **Settings >Flip Screen**.

To Return to the Power Vision Main Menu

Touch **Back**.

Device Info Menu

To View Information About the Power Vision

Device Info displays information about the Power Vision.

Touch **Device Info**.

Dealer Info Menu

To View Information About the Dealer

Dealer Info displays dealer information.

Touch **Dealer Info**.

Understanding AutoTune

The Power Vision supports a process to correct your VE tables (and AFR) based on your OEM narrowband O2 sensors (Basic Method) or with wideband O2 sensors from the Dynojet AutoTune Kit (Pro Method). In addition, AutoTune can use the ECM's ion sensing knock control strategy in order to remove timing/adjust spark advance from areas of your calibration where knock was present. Refer to AutoTune Notes and Tips.

There is no longer a need to go through the cumbersome process of exporting value files, logging, processing values and logs in Log Tuner, etc. Power Vision automatically "sets up the tune", logs the correct channels, and applies a correction to your tune. Leave the laptop at home, you now have a full time, professional tuning expert inside your Power Vision.

Most modern EFI systems employ closed loop feedback for fuel control. These systems are often based around narrowband O2 sensors that provide feedback to the ECM in regards to how rich or lean the vehicle is running. If there is an error between what the ECM is asking for and what the OEM narrowband sensor measures, a correction is made to adjust the lean or rich condition. These corrections are stored in what are called Adaptive fuel tables. Narrowband sensors are ONLY accurate at, or near, the stoichiometric value of the fuel being used, which is 14.7:1 for gasoline. This value is where complete combustion would occur, however, is not ideal for all operating conditions of an engine.

A typical Harley-Davidson ECM calibration has areas of closed loop and open loop. Open loop means feedback from the O2 sensors is not used. When the engine is in a range that requires precise measurement, but is outside the reliable window of a narrowband sensors operation (considered 14.3 -15.2 AFR), then a tuner/EFI specialist must rely on wideband O2 sensor data. The wideband O2 sensor values provide tuners or electronic tuning devices with data needed to make decisions on how they will address fueling in the open loop areas of the ECM calibration. In the case of a Harley engine management system, we fix the error by adjusting the Volumetric Efficiency tables.

Power Vision offers two methods for AutoTune:

- AutoTune Basic—utilizes the narrowband O2 sensors on bikes that have OEM closed loop fuel control. Refer to AutoTune Basic.
- AutoTune Pro—requires the use of Dynojet's AutoTune wideband O2 control module that has dual wideband O2 sensors. Refer to AutoTune Pro.

The Power Vision can provide meaningful tuning feedback from either the OEM narrowband O2 sensors and/or from the AutoTune module's wideband O2 sensors.

To Enable AutoTune

To Start an AutoTune Session

To Export a Learned Tune

To Load a Custom Tune File

To Edit AutoTune Settings

AutoTune Basic

Without any additional modules, the Power Vision will take advantage of what the ECM "sees" from its OEM narrowband O2 sensors and use that data to achieve the target AFR. This method works great in those operating areas where it makes sense to run in a lean state: idle, light load, and cruise conditions. AutoTune Basic will fix the normal closed loop range, but can also temporarily extend the closed loop range to gain insight on the actual AFR in areas that are normally open loop (high load/high RPM). At high load/high RPM ranges this "temporary situation" is not ideal, and this is where it is advantageous to use AutoTune Pro.

Utilizing the AutoTune Basic AFR data and other data from the H-D OEM data bus, the Power Vision can automatically fix the deviation between the target AFR and actual AFR by adjusting the VE tables, instead of storing the changes in an Adaptive fuel table. The data is learned in real time, but processing the data and adjusting the tune is done in an "offline state" (key on/engine off). After the data is collected, the Power Vision can process the data, correct the tune, and then re-flash the corrected tune into the ECM.

Neither AutoTune Basic nor AutoTune Pro requires that you interface with a computer. Power Vision sets up the AutoTune parameters, monitors and logs the data, and then corrects the tune to ensure that the final tune has optimum values in the VE table(s).

AutoTune Pro

Utilizing a Dynojet AutoTune wideband control module, Power Vision can provide a complete, refined, and powerful tune. The AutoTune module uses wideband O2 sensors in order to measure the actual AFR in the exhaust; these sensors can accurately sample AFR values from 10.0:1 to 18.0:1 vs. 14.3 - 15.2 from narrow band sensors. Like AutoTune Basic, the entire process will correct the error from what is commanded in the ECM defined as the target AFR, and the AFR that's actually measured in the exhaust. The AutoTune Pro method allows the target AFR table to include AFR values that are ideal for all operating conditions, resulting in the best data for high load/high RPM operating ranges as well as idle, light load, and cruise conditions.

Utilizing the AutoTune Pro AFR data and other data from the H-D OEM data bus, the Power Vision can automatically fix the deviation between the target AFR and actual AFR by adjusting the VE tables, instead of storing the changes in an Adaptive fuel table. The data is learned in real time, but processing the data and adjusting the tune is done in an "offline state" (key on/engine off). After the data is collected, the Power Vision can process the data, correct the tune, and then re-flash the corrected tune into the ECM.

Neither AutoTune Basic nor AutoTune Pro requires that you interface with a computer. Power Vision sets up the AutoTune parameters, monitors and logs the data, and then corrects the tune to ensure that the final tune has optimum values in the VE table(s).

AutoTune Wideband O2 Sensor Installation Options

- On bikes that do not have factory closed loop fuel control/O2 sensors, 18mm O2 bungs must be welded into the exhaust or an aftermarket exhaust system that has 18mm O2 bungs can be installed.
- On bikes that have factory closed loop fuel control/18mm narrowband O2 sensors, the 18mm wideband O2 sensors can simply be installed in place of the OEM sensors. This requires that you temporarily (or permanently) disable the closed loop function of the ECM. If the bike has OEM 12mm narrowband O2 sensors, 18mm O2 bungs must be welded into the exhaust.
- Retain the OEM narrowband O2 sensors/closed loop fuel control and install weld in bungs for the AutoTune wideband O2 sensors.

Changes Made During AutoTune

The following changes are made to the tune file during the AutoTune process.

AutoTune Pro—automatically applies a .pvv to the tune that does the following:

- Sets the base fuel table to one static value, 13.0 for AFR or .89 lambda.
- Disables EITMS/PE/Adaptive Control.
- AE/DE are still active in the tune, but there's logic to disable or minimize learning when they're active.

AutoTune Basic—automatically applies a .pvv to the tune that does the following:

- Sets the base fuel table to 14.6 for AFR based calibrations and .982 for lambda based calibrations.
- Disables AE/DE/EITMS/PE/Adaptive Control.
- Retards 4 degrees of timing.
- Bias the close loop range to .700mv on AFR based calibrations.

General

- Sets calib to PVAT (Session Number).
- Clears adaptive fuel tables after flashing.

AutoTune Notes and Tips

- AutoTune can use the ECM's ion sensing knock control strategy in order to remove timing/adjust spark advance from areas of your calibration where knock was present. This feature can only remove timing, it will never add it. It is not recommended to use this feature with AutoTune Basic, only AutoTune Pro. This feature is disabled by default, but changing the "Max Spark Learn" from 0 to a value such as 10 would make it active.
- If you do not have Wideband O2 sensors installed (ie. those included in the Dynojet AutoTune kit) select Basic mode.
- The default values are acceptable for most big twin models. If you have a V-Rod or Sportster, you will need to adjust the temperature (in degrees C) and RPM limit to an acceptable range. Refer to To Edit AutoTune Settings.
- Knock control on Sportsters is not possible; the ECM does not support this feature and AutoTune does not support automated spark adjustment based on knock activity.
- In Pro mode, you can tune fuel and spark simultaneously; however, Dynojet recommends to address fuel first, and then focus on spark. To do this, after you've completed tuning the fuel (via adjustments to your VE tables) and flashed the corrected tune file to your ECM, you can then start a new AutoTune session that's focused on spark corrections. In the settings area of AutoTune you can set Max VE Learn to 0 and Max Spark Learn to 10. This will disable AutoTune's ability to change fuel, but allow it to monitor, record, and eventually correct spark advance based on knock activity.

INDEX

A

about window 3-33
acceleration enrichment 3-47
acceleration enrichment multiplier 3-48
active compression release 3-50
active exhaust 3-50
active file 3-25, 3-37
active intake 3-50
adaptive control 3-50
adaptive control enable temp 3-45
adaptive control maximum temp 3-45
adaptive control maximum temp hysteresis 3-46
adaptive control minimum temp hysteresis 3-46
adaptive knock retard 3-51
add 3-36
air flow
  charge dilution effect 3-42
  charge dilution effect (front) 3-42
  charge dilution effect (rear) 3-42
  DBW throttle position limit 3-44
  drive by wire speed limit vs gear 3-44
  drive by wire throttle limit vs gear 3-42
  engine displacement 3-42
  IAC warm-up steps 3-42
  idle rpm 3-43
  idle rpm adder 3-44
  map default table 3-43
  map load normalization 3-43
  map tooth IVC (front cyl) 3-43
  map tooth IVO (front cyl) 3-43
  map tooth offset (rear cyl) 3-43
  number of crank teeth 3-43
  throttle blade control stage I 3-43
  throttle blade control stage II 3-43
  throttle table transition gear 3-44
  VE front 3-43
  VE rear 3-44
air fuel ratio, lambda 3-47
air fuel ratio, stoich 3-47
airflow 3-42
apply license 3-31
autotune
  basic 4-19, 4-58, 4-59
  changes made 4-60
  datalog 4-21
  datalogger modes 4-24
  datalogger operating conditions 4-23
  edit settings 4-29
  enable 4-17
  export a learned tune 4-24
  load a custom tune 4-27
  log tuner 4-22
  notes and tips 4-61
  pro 4-19, 4-58, 4-59
  start session 4-21
  understanding 4-58
  wideband o2 4-60

B

backup stk 3-35
basic autotune 4-59
basic autotune mode 4-19
brightness 4-53

C

calibrate touch screen 4-55
calibration ID 3-42
cell colors 3-26, 3-37
  compare high/low 3-26
  table range 3-26
cell math toolbar 3-32, 3-36
  add 3-36
  customizing 3-38
  divide 3-36
  multiply 3-36
  percent 3-36
  set 3-36
  subtract 3-36
  value 3-36
cells
  copy 3-16
  paste 3-16

charge dilution effect 3-42
charge dilution effect (front) 3-42
charge dilution effect (rear) 3-42
close compare 3-25, 3-37
closed loop 3-49, 3-51
  closed loop bias front 3-49
  clossed loop bias 3-49
  clossed loop bias rear 3-49
  clossed loop lambda range 3-49
closed loop bias 3-49
closed loop bias front 3-49
closed loop bias rear 3-49
closed loop lambda range 3-49
closed loop minimum temp 3-46
closed loop minimum temp hysteresis 3-46
closed throttle spark front 3-51
closed throttle spark rear 3-52
code 4-55
compare file 3-26, 3-37
  visual identifiers 3-41
compare high/low 3-26
compare menu 3-25
  active file 3-25
  cell colors 3-26
  close compare 3-25
  compare file 3-26
  create difference report 3-27
  delta 3-26
  load compare 3-25
  show delta as percent 3-27
  show only differences 3-27
compare toolbar 3-32, 3-37
  active file 3-37
  cell colors 3-37
  close compare 3-37
  compare file 3-37
  customizing 3-38
  delta 3-37
  load compare 3-37
config, quick tune 4-35
contact
  email 1-1
  phone 1-1
conventions 1-2
copy 3-34
copy cells 3-16
copy of current tune file 4-12
copy of original tune file 4-9
cranking fuel 3-47
create a log 4-47
create difference report 3-27
custom tune file 4-8
customizing the toolbars 3-38
cut 3-34

D

datalog 4-21
datalog menu
  create a log 4-47
  gauge limits 4-41
  gauges 4-39
  playback a log 4-45
  reset trip/economy A 4-46
  reset trip/economy B 4-47
  signals 4-46
  visual warnings 4-41
datalogger modes 4-24
datalogger operating conditions 4-23
DBW throttle position limit 3-44
dealer info 4-57
dealer info menu 4-57
  dealer info 4-57
deceleration enleanment 3-47
deceleration enrichment multiplier 3-48
delta 3-26, 3-37
description 3-42
device info 4-56
device info menu 4-56
  device info 4-56
disable EUAO 3-18
divide 3-36
drive by wire speed limit vs gear 3-44
drive by wire throttle limit vs gear 3-42
drivers 2-2
DTCs 4-49
dynojet tune file 4-4

E

ecm status 4-16
edit 3-16
  copy 3-16
  cut 3-16
  interpolate 3-16
  interpolate, horizontal 3-16
  redo 3-16
  smooth 3-16
  undo 3-16
edit a tune file 4-15
edit autotune settings 4-29
edit menu 3-16
edit tune 4-15
EITMS 3-50
EITMS off temp 3-45
EITMS on temp 3-45
email, contact 1-1
enable autotune 4-17
engine displacement 3-42
environment 3-45
  adaptive control enable temp 3-45
  adaptive control maximum temp 3-45
  adaptive control maximum temp hysteresis 3-46
  adaptive control minimum temp hysteresis 3-46
  closed loop minimum temp 3-46
  closed loop minimum temp hysteresis 3-46
  EITMS off temp 3-45
  EITMS on temp 3-45
  knock control minimum temp 3-45
  knock control minimum temperature hysteresis 3-45
exit pc link mode 3-24
export a learned tune 4-24

F

file
- import power commander map file 3-7
- load all values 3-12
- load selected values 3-14
- open 3-5
- save all values 3-9
- save as 3-6
- save selected values 3-10
- save selected values append 3-11

file menu 3-5
flip screen 4-55
fuel 3-47
- acceleration enrichment 3-47
- acceleration enrichment multiplier 3-48
- air fuel ratio, lambda 3-47
- air fuel ratio, stoich 3-47
- cranking fuel 3-47
- deceleration enleanment 3-47
- deceleration enrichment multiplier 3-48
- injector gas constant 3-48
- injector size 3-47
- mpg adjustment 3-48
- PE air fuel ration, lambda stoich 3-48
- warmup enrichment lambda 3-48
- warmup enrichment stoich 3-48

fuel, quick tune 4-37

G

gauge limits 4-41
gauges 4-39
gear 3-49
- gear ratios 3-49
- speedometer calibration 3-49

gear ratios 3-49
general, quick tune 4-34
get ECM data 3-21
get log 3-19, 3-35
get log from pv 3-19
get tune 3-17, 3-35
get tune from pv 3-17

H

heated O2 sensors 3-50
help menu 3-33
- about window 3-33

I

IAC warm-up steps 3-42
idle rpm 3-43
idle rpm adder 3-44
import .djm, .pvm 3-7
import power commander map file 3-7
info 3-35
injector gas constant 3-48
injector size 3-47
interpolate 3-16
interpolate, horizontal 3-16

K

knock control 3-50
knock control minimum temp 3-45
knock control minimum temperature hysteresis 3-45

L

lambda based 3-42
limits and switches 3-50
- active compression release 3-50
- active exhaust 3-50
- active intake 3-50
- adaptive control 3-50
- closed loop 3-51
- EITMS 3-50
- heated O2 sensors 3-50
- knock control 3-50
- PE disable rpm 3-51
- PE disable tps 3-51
- PE enable rpm 3-50
- PE enable tps 3-50
- rpm limit 3-50

load a copy of current tune file 4-12
load a copy of original tune file 4-9
load a custom tune 4-27
load a custom tune file 4-8
load all values 3-12
load compare 3-25, 3-37
load selected values 3-14
lock tune 3-18
log tuner 4-22

M

map default table 3-43
map load normalization 3-43
map tooth IVC (front cyl) 3-43
map tooth IVO (front cyl) 3-43
map tooth offset (rear cyl) 3-43
max knock retard 3-51
mpg adjustment 3-48
multiply 3-36

N

number of crank teeth 3-43

O

open 3-5, 3-34
options 3-28
- stock files 3-29
- tune files 3-30
- units 3-28
- value files 3-31

P

paste 3-16, 3-34
paste cells 3-16
PE air fuel ration, lambda stoich 3-48
PE disable rpm 3-51
PE disable tps 3-51
PE enable rpm 3-50
PE enable tps 3-50
PE spark 3-51
percent 3-36
phone, contact 1-1
playback a log 4-45
power vision drivers, installing 2-2
power vision information 3-17
power vision menus 4-2
  datalog menu 4-39
  dealer info menu 4-57
  device info menu 4-56
  program vehicle menu 4-4
  settings menu 4-53
  vehicle tools menu 4-48
power vision toolbar 3-32
power vision tune file
  open 3-5
  save as 3-6
power vision, installing 2-9
powervision menu 3-17
  exit pc link mode 3-24
  get ECM data 3-21
  get log from pv 3-19
  get tune from pv 3-17
  pv info 3-17
  send original tune to pv 3-23
  send stock file to pv 3-24
  send tune to pv 3-18
  update tune using pv 3-21
powervision toolbar 3-35
  backup stk 3-35
  customizing 3-38
  get log 3-35
  get tune 3-35
  info 3-35
  send tune 3-35
pro autotune 4-59
pro autotune mode 4-19
program vehicle menu
  configure quick tune 4-34
  ecm status 4-16
  edit a tune file 4-15
  edit autotune settings 4-29
  enable autotune 4-17
  export a learned tune 4-24
  load a copy of current tune file 4-12
  load a copy of original tune file 4-9
  load a custom tune 4-27
  load a custom tune file 4-8
  load a dynojet tune file 4-4
  start autotune 4-21
pv info 3-17
pv toolbar 3-32

Q

quick tune
  config 4-35
  configure 4-34
  fuel 4-37
  general 4-34
  spark 4-37
  tweaks 4-36
  ve 4-38

R

read ecm 4-51
redo 3-16
reset trims 4-50
reset trip/economy A 4-46
reset trip/economy B 4-47
reset ui 3-32
reset user interface 3-32
restore original tune 4-52
rpm limit 3-50

S

save 3-34
save all values 3-9
save as 3-6
save selected values 3-10
save selected values append 3-11
scalar 3-39
send original tune to pv 3-23
send stock file to pv 3-24
send tune 3-18, 3-35
send tune to pv 3-18
  disable EUAO 3-18
  lock tune 3-18
set 3-36
settings menu 4-53
  brightness 4-53
  code 4-55
  flip screen 4-55
  touch calibrate 4-55
  units 4-53
setup menu 3-28
  apply license 3-31
  options 3-28
show delta as percent 3-27
show only differences 3-27
signals 4-46
smooth 3-16
software level 3-42
spark 3-51
  adaptive knock retard 3-51
  closed throttle spark front 3-51
  closed throttle spark rear 3-52
  max knock retard 3-51
  PE spark 3-51
  spark adjust by air temp 3-52
  spark adjust by engine temp 3-52
  spark adjust by head temp 3-52
  spark advance front 3-51
  spark advance rear 3-51

spark adjust by air temp 3-52
spark adjust by engine temp 3-52
spark adjust by head temp 3-52
spark advance front 3-51
spark advance rear 3-51
spark, quick tune 4-37
speedometer calibration 3-49
standard toolbar 3-32, 3-34
  copy 3-34
  customizing 3-38
  cut 3-34
  open 3-34
  paste 3-34
  save 3-34
start autotune 4-21
status bar 3-54
stock files 3-29
stored DTCs 4-49
subtract 3-36
switch 3-39

T

table range 3-26
tables 3-40
technical support 1-1
throttle blade control stage I 3-43
throttle blade control stage II 3-43
throttle table transition gear 3-44
touch calibrate 4-55
touch screen 4-55
tune file 4-5, 4-18
tune files 3-30
tune info 3-42
  calibration ID 3-42
  description 3-42
  lambda based 3-42
  software level 3-42
tune items 3-39, 3-53
  airflow 3-42
  closed loop 3-49
  environment 3-45
  fuel 3-47
  gear 3-49
  limits and switches 3-50
  scalar 3-39
  spark 3-51
  switch 3-39
  tables 3-40
  tune info 3-42
  visual identifiers 3-41
tweaks, quick tune 4-36

U

undo 3-16
units 3-28, 4-53
update client 2-5
update tune using pv 3-21
user level 3-28
  options 3-28

V

value 3-36
value files 3-31
VE front 3-43
VE rear 3-44
ve, quick tune 4-38
vehicle info 4-48
vehicle tools menu
  read ecm 4-51
  reset trims 4-50
  restore original tune 4-52
  stored DTCs 4-49
  vehicle info 4-48
view gagues 4-39
view menu 3-32
  cell math toolbar 3-32
  compare toolbar 3-32
  pv toolbar 3-32
  reset ui 3-32
  standard toolbar 3-32
visual identifiers 3-41
visual warnings 4-41

W

warmup enrichment lambda 3-48
warmup enrichment stoich 3-48
WinPV menus 3-3
  compare menu 3-25
  edit menu 3-16
  file menu 3-5
  help menu 3-33
  powervision menu 3-17
  setup menu 3-28
  view menu 3-32
WinPV toolbar 3-34
  cell math toolbar 3-36
  compare toolbar 3-37
  powervision toolbar 3-35
  standard toolbar 3-34
WinPV update client 2-5
WinPV user interface 3-2